

October • 1953

finish

THE MAGAZINE OF
Appliance AND
Metal Products MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

PATTERSON *Arlcite*

high-density
**GRINDING
BALLS**

with the

Patterson
High-Bond
for longer life!

The finest of all high density grinding balls. Heavy in weight, they grind faster—Tough in bond, they last longer—assuring vastly reduced ball make-up costs.

Richard L. Cawood
President



The Patterson Foundry and Machine Company
East Liverpool, Ohio, U. S. A.

NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI,
ATLANTA, CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO,
SEATTLE

The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL

Pulsation Chamber. Just one example of a great variety of Danielson precision assemblies.



Air Shroud for air cooled engines. A typical Danielson spot welding assembly on automatic spot welders for low cost and speed production.



Fabricated steel cabinets of all sizes and description.



18 ga. steel one piece draw swivel chair base.

12" rule photographed with chair base to show comparative size.

LOOK TO DANIELSON

for a
VARIETY
of
*Quality
Products*

Pictured here are a few of the many items we produce for satisfied customers. What we cannot picture is the high quality and service Danielson is equipped to give you — try us!

Write — 'phone — or wire us today!



V. W. DANIELSON
MANUFACTURING COMPANY

3360 W. HOPKINS ST. • MILWAUKEE 16, WISCONSIN • Phone CUSTER 3-3800



"LITHOFORM"®
makes paint stick to
galvanized iron
and other zinc or
cadmium surfaces

PROBLEM:

To eliminate the peeling of paint from zinc and zinc-coated structures or products.

SOLUTION:

Treat all zinc surfaces with "LITHOFORM" before painting. "LITHOFORM" is a liquid zinc-phosphate coating chemical that can be applied by brushing or spraying at the Yard, or by dipping or spraying in industrial equipment. "LITHOFORM" forms a durable bond for paint. It is economical; it eliminates frequent repainting; it protects both the paint finish and the metal underneath.

ACTION:

Send for our new descriptive folder on "LITHOFORM" and for information on your own particular metal protection problem.

"LITHOFORM" meets Government Specifications. Specify "LITHOFORM" for all painting and refinishing work on zinc and zinc-coated surfaces.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY
R&D
AMBLER, PA

Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals
Detroit, Michigan Niles, California Windsor, Ontario

American Chemical Paint Co.
Ambler, Pennsylvania

Gentlemen:

Please send me a free copy of your descriptive folder on "LITHOFORM."

NAME.....

COMPANY
NAME.....

ADDRESS.....

CITY..... STATE.....

MEETINGS

METAL STAMPERS MEETING

Pressed Metal Institute, annual meeting, Bellevue-Stratford Hotel, Philadelphia, October 7-10.

PACKAGING FORUM

Packaging Institute, annual forum, Hotel Statler, New York City, October 12-14.

NATIONAL SAFETY CONGRESS

National Safety Council, annual congress and exposition, Conrad Hilton Hotel, Chicago, October 19-23.

NATL. METAL EXPOSITION

National Metal Exposition, Public Auditorium, Cleveland, Ohio, October 19-23.

INDUSTRIAL PACKAGING SHOW

Society of Industrial Packaging and Materials Handling Engineers, annual Industrial Packaging and Materials Handling Exposition, Short Courses and Competition, Mechanics Hall, Boston, Mass., October 18-24.

AMERICAN GAS ASSN. MEETING

American Gas Association, annual Convention, Keil Auditorium, St. Louis, October 26-29.

PAINT, VARNISH MEETING

Federation of Paint and Varnish Production Clubs, Chalfonte-Haddon Hall, Atlantic City, October 29-31.

ENAMELERS CLUB MEETING

Central District Enameler's Club, tour of Armco Steel Corporation plant, Middletown, Ohio, November 6.

REFRIGERATION EXPOSITION

Refrigeration Equipment Manufacturers Association, all-industry refrigeration and air conditioning exposition, Public Auditorium, Cleveland, Ohio, November 9-12.

ELECTRICAL MFRS. MEETING

National Electrical Manufacturers Association, annual meeting, Haddon Hall Hotel, Atlantic City, November 9-12.

ADS OUT



finish SUGGESTION BOX

Unit for punching holes in curved, straight flanges, rims and angles

A new line of horizontal hole punching units are designed to punch holes in curved and straight flanges, rims and angles, and similar shaped and formed work. Punching holes in the side of the work, instead of on top of flat surfaces, is made possible by designing these units so the punches move back and forth horizontally rather than up and down.

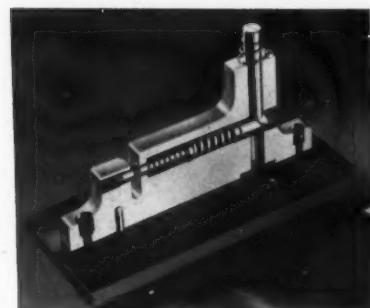
The units can eliminate built-up, single-purpose, cam-action dies on many jobs. Each unit is independent and self-contained, permitting the same group of units to be used and re-used on press brake rails and on templates in stamping presses. Nothing is attached to press ram. These set-ups on rails or templates permit

unlimited center-to-center horizontal hole punching patterns.

All parts — punch, die, guide and stripping spring — are held as a unit by the holder. In addition, the holder assures perfect alignment of punch and die, eliminating time customarily required to align conventional dies.

Press down-time between production runs is reduced to an absolute minimum by setting up the patterns outside the press. In this way, no set-up time is required after the set-up is placed in the press. This is made possible because nothing is attached to press ram.

All working parts of the hole punching units are hardened and ground steel. The holders are all-steel



Cross-section of horizontal hole punching unit showing the relationship of all parts.

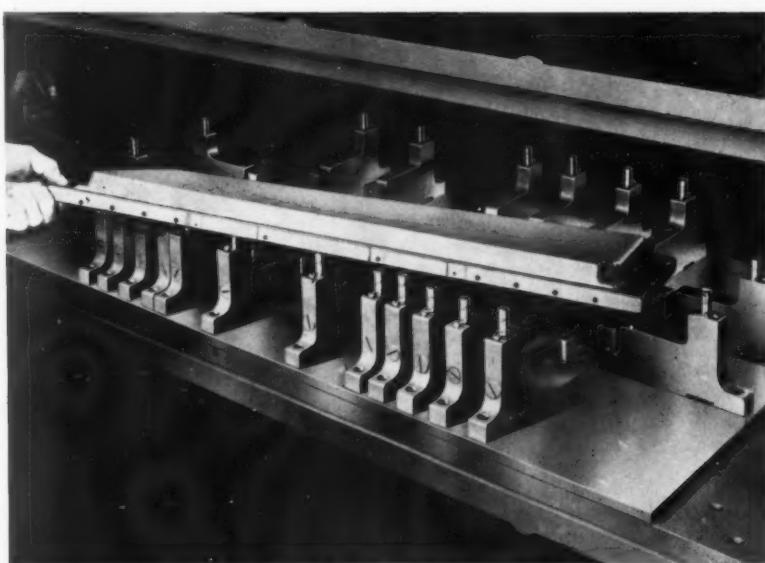
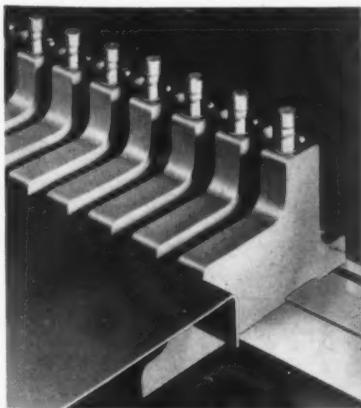
construction. Punches and dies are easily and quickly removed from the unit for sharpening and replacing.

In case of replacements, the entire unit may be removed and replaced quickly in the set-up without disturbing the other units or the other parts of the set-up. With a few extra units, it is possible to interchange a unit rather than stop a production run to replace or sharpen a punch or a die. Dulled punches and dies may be sharpened at a more convenient time.

The horizontal hole punching units punch holes up to $\frac{1}{2}$ " in diameter in mild steel up to $\frac{1}{8}$ " thick.

Source for further information on horizontal hole punching units may be obtained by writing to finish.

Right: set-up of horizontal hole punching units in a stamping press with holes punched in work. Below: Showing punching units with the work nested in position.



3-in-1 Kitchen Unit Top

Fired in one piece without sagging... using

Ti-Namel®



greater sag resistance with





**f THE
finish LINE**

FROM THE EDITOR'S NOTEBOOK

Take a Look at Your Sales Literature!

A friend outlined a recent experience in connection with the selection of a new automatic washer.

"Mrs." was the first to look them over and get literature on five or six different makes. Said she, "I can't seem to make 'heads or tails' of the descriptive information in this literature — I'm confused — lots of claims for whiter washes, labor saving, and generalities, but no specific information on how it works, and what makes the 'wheels' go round."

Friend husband (a capable engineer and vice president of a manufacturing company) said, "Never mind, just give me the literature and I will explain it to you." But friend husband was stumped too — and not a little flustered and embarrassed.

We have made no extensive study of appliance literature, but if this friend's experience is typical, we suggest that manufacturers "take a look at their literature."

Women do have a big voice in purchasing appliances, but in the case of mechanical products the men folks enter in too. In fact, in many families we know it's a "partnership" consideration.

Some one may introduce sales literature with separate "his and her" facts, and if the women read the men's section and the men turn to the facts for women, who cares — if the questions are answered and a sale is made.

Television "Tubes"—Glass or Steel?

In this issue, the article "Mass Producing the 'Metal Television Tube'" completes a series on the fabrication and

finish OCTOBER • 1953

finishing of the steel television "cone" and the production processes for completing the television viewing tube.

This represents an excellent example of what may be expected in the way of industry competition during the months to come.

As the descriptive, illustrated feature in this issue was being developed by **finish** editors and photographers, the trend to steel was well under way — and the business involved could not be termed "peanuts." A single tube producing plant could readily use over *60 tons of steel* (stainless or enameling grade) per day when in full production.

But, every tube produced with a steel envelope or cone meant a reduction in the use of all-glass tubes. The television tube industry represents many millions of dollars annually to the glass producers, and although important glass components are required for the "steel" tube, the possible reduction in total glass usage is obvious.

To show how rapidly competitive situations change — as this article is published, glass is reported to again be in the "driver's seat."

When two industries as important as glass and steel have a common market at stake, representing such a large current market, and such a bright future, as television, it would seem that a combination of the best research and the best selling efforts of both will be called upon to meet the battle challenge.

Dana Chase

EDITOR AND PUBLISHER



PLANTS that learned about Century time-proved frits during the past six months have more "dollars in their pockets" today as a result. Customers who have used Century enamels year after year can show a nice fat saving in enamel plant operating costs—that's why they continue to use them year after year.

Sure, they are priced right to start, but there are "in plant" savings that count up fast. Century ground coat enamels give the grip, the durability so important to your product, and they are easy and economical to apply. Century cover coats produce the finishes you can sell with confidence and produce them without extra fuss or special handling in the plant.

Make a note to arrange for a trial of Century

frits before another month rolls by. Then, by the end of this year you will agree with us that Century frits "put dollars in your pockets."

**FRIT from
CENTURY**

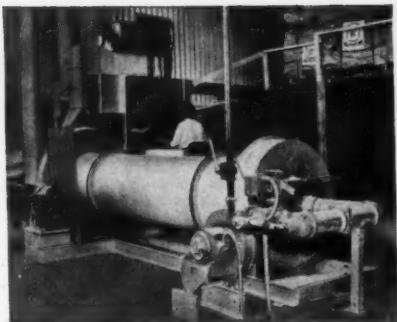
FRIT  **MASTERS**

CENTURY VITREOUS ENAMEL COMPANY

• 6641-61 S. Narragansett Ave., Chicago 38, Ill. •



← WELDING INCONEL feeder spirals to inner Inconel shell of a perlite expansion furnace. This shell, in which the mineral is pre-heated and then "popped" at temperatures ranging to 2000° F., is suspended only at the ends, and rotates constantly. Use of Inconel minimizes sagging, reduces crust formation, scaling and abrasion, and provides rapid heat transfer. → Furnace in operation, with raw ore being dropped into burner flame. Illustrations by courtesy of The Perlite Corporation, Lansdowne, Pa.



Improved High-Temperature Furnace

Boosts Production of the "CINDERELLA MINERAL"

Twelve years ago, it was commercially unknown.

Today, there's a demand for more than 18 million cubic feet a year. And the limit is nowhere in sight.

That's the Cinderella story of perlite, a glassy volcanic mineral found in the Rocky Mountains.

First used in place of sand as a concrete and plaster aggregate, perlite has now proved its value in many other fields. It is used in drilling muds and oil well cements...as a filler in plastics and resins...even as packing material for fragile merchandise.

In theory, the processing of perlite is fairly simple. You crush the mined or quarried ore (which is nearly 75% silica), and then heat it to a high temperature. Entrapped water vaporizes, and the ore pops like corn, expanding to 10 times its original volume.

There's the finished product! And many times, too, the processors of perlite also look at a "finished" furnace. For processing temperatures that sometimes exceed 2000° F. play hob with ceramic linings. Heating and cooling bring on spalling. Even the rough ore particles themselves do plenty of damage.

As production demands soared, a way had to be found to beat these furnace problems. And it was—with Inconel®, the high-temperature alloy so widely used in jet-engine combustion chambers and metal heat-treating equipment.

Long known as one of the most durable high-temperature metals, Inconel resists wear and abrasion. It helps protect product purity. It reduces clinker formation...scaling...buckling...corrosion. In perlite furnaces, Inconel promises a service life up to 5 times that of firebrick.

If you have a high-temperature metal problem, Inco's High-Temperature Engineers may be able to help you. Write us for your copy of the "High-Temperature Work Sheet," a simplified form on which to describe your problem. No obligation.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.



INCONEL ...for long life at high temperatures

It's as simple as that...

"OUT OF OUR CARTON - INTO YOUR DOOR"

PERMA-VIEW

**..THE WINDOW YOU
CAN SEE THROUGH**

Always . . .



CROWN STOVE WORKS is offering PERMA-VIEW oven door windows "as optional equipment on all models at the present time", according to J. C. Rogers, Vice President — Sales



Yes sir, it's as simple as that. The PERMA-VIEW oven door window comes to you ready for immediate installation in your range—to add a sales feature second to none, as the demand grows for "visible baking."

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging."

More and more range manufacturers are turning to PERMA-VIEW as a practical, economical and effective sales feature for their new models. We will gladly work with your engineering department in adapting its use to your new range. Write for complete information.

MILLS PRODUCTS, INCORPORATED
1015 W. MAPLE ROAD • WALLED LAKE, MICHIGAN

THE finish spotlight



RCA Estate gas ranges are now available with handy Dispos-a-bowls, a new labor-saving feature for the housewife. Low-cost aluminum burner bowl inserts that can be cleaned with a damp-wipe, washed in the dishpan, or discarded after a serious spill-over, are now standard equipment on all RCA Estate gas models.

This plant
followed the advice of
CARBORUNDUM and

...Doubled the life of its Muffle

This continuous enameling furnace was designed for high production rates. Silicon carbide refractories, therefore, were used for the muffle and preheat-zone floor. This gave the fast rate of heat transfer and uniformity required; refractory life, however, was rather limited. After checking operating conditions we suggested that the muffle and floor be made of CARBOFRAX silicon carbide refractories engineered to the job.

The results have been excellent. These CARBOFRAX refractories already have gone twice as long as other silicon carbide refractories — and are still giving good service. They have required absolutely no down time since being installed.

Perhaps it would pay to have one of our engineers make a check for you. Whatever heavy duty refractories you use — silicon carbide, aluminum oxide, mullite, etc. — we can give you the experienced recommendations needed for optimum refractory service. We make all types of super refractories (the world's largest manufacturer) to give you the right ones.

Write or phone us today. No obligation, of course. The address: Dept. K-103, Refractories Div., The Carborundum Co., Perth Amboy, N. J.

This is one of the world's largest continuous enameling furnaces in size of panels that can be handled. It operates at 1500 F., and is oil fired. The muffle and preheat floor are made of CARBOFRAX refractories; the support arches of MULLFRAX electric furnace mullite.

CARBORUNDUM

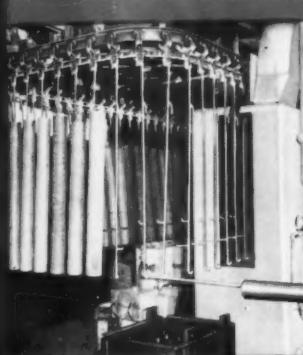
Trade Mark

"Carborundum," "Carbofrax," and "Mullfrax" are registered trademarks which indicate manufacture by The Carborundum Co.

continuous two-coat PAINT finishing system

OPERATIONS:

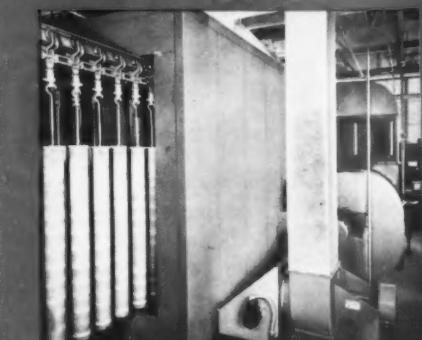
1	Alkali Wash	6	Gas Oven Dry
2	Water Rinse	7	Prime Paint Dip
3	Phosphatize	8	Prime Coat Bake
4	Water Rinse	9	Assembly Operation
5	Acidic Rinse	10	Spray Finish Paint
11		11	Finish Coat Bake



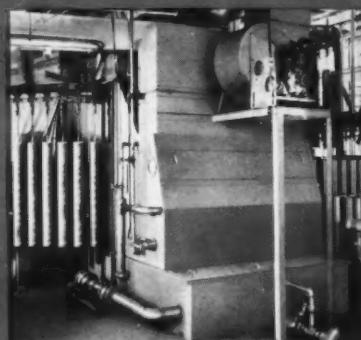
Machined rocket motor tubes entering the cleaning machine at the Koppers Company Metal Products Div., Baltimore, Maryland.



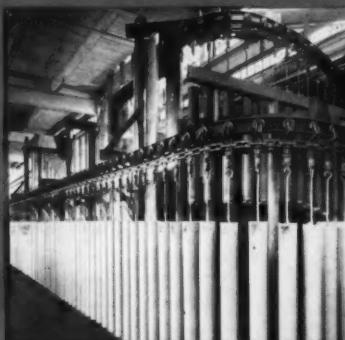
After cleaning, the rocket tubes leave the cleaning machine (left) and enter an oven (right) which dries them prior to application of the prime coat.



Here the parts enter the drying oven after being prime coat painted in a conveyor dip tank. Parts are in this gas heated oven approximately nine minutes.



With the prime coat baked, the rocket tubes enter (at the left) the finish coat spray booth. This booth is designed to accommodate an electrostatic spray unit.



Finished rocket motor tubes, after leaving the finish coat baking oven. In the background is seen the dipping tank in which the prime coat of paint is applied.

Cincinnati
designed, fabricated
and installed for
5" ROCKET MOTOR TUBES

The finishing of metal parts to ordnance specifications is a painstaking technical job designed to insure against finish failure. This Cincinnati installation is a good example of such a job.

Machined steel tubing, 5" in diameter and 49" long, is carefully cleaned inside and out, removing grease, oil, chips and coolant. On a 3 F. P. M. monorail conveyor, the parts are carried through the steps shown. The result is a part finished to rigid specifications.

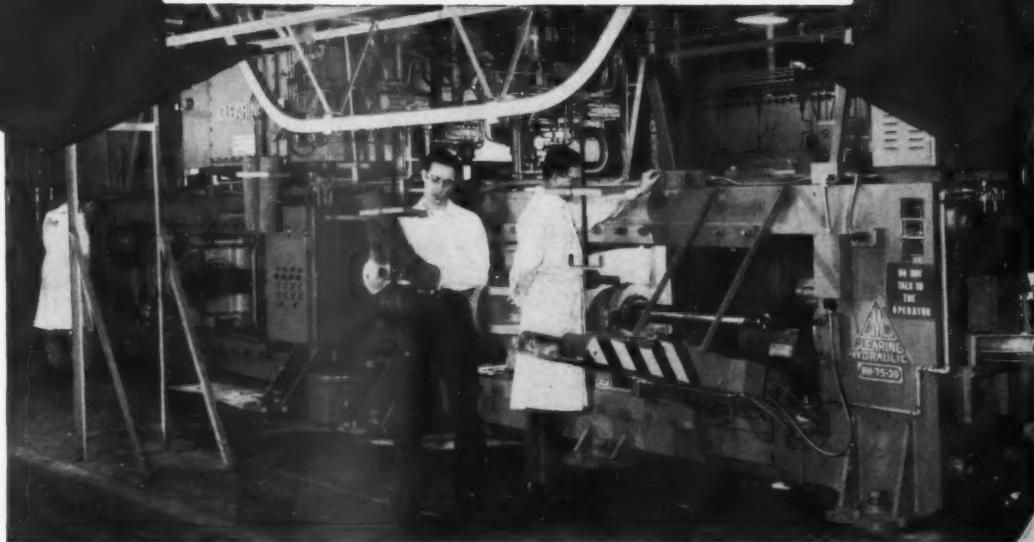
Whether your finishing problem is complicated or simple . . . your parts large or small . . . Cincinnati Engineers can design the equipment you need . . . a complete system or any part.

A New Catalog, "Complete Finishing Systems," is available on request. Write for your copy TODAY.

Cincinnati

CLEANING AND FINISHING MACHINERY CO., INC.
2004 Hageman Street, Sharonville, Ohio

1 press does the work of 2



CLEARING Helps Rheem Boost Production

When Rheem Mfg. Co. took on the job of producing cartridge cases, they tooled up their New Orleans plant with a new type of Clearing hydraulic press—a press that revolutionizes cartridge case production.

The new Clearing double end press produces at both ends of the stroke—does the work of two conventional presses. While one slide has completed a draw and is on its return stroke, the other slide is performing a drawing operation on the opposite end of the press.

Clearing horizontal double end presses represent savings not only in capital investment, but they require less manufacturing space and less maintenance than two conventional presses. Double end presses also reduce original installation cost, productive labor cost, and power consumption—since only one hydraulic drive unit is used.

The double end press was Clearing's answer to the problem of cartridge case manufacture. Supplying the right answers to manufacturers who make all types and sizes of products has been a strong point with Clearing engineers for years. If you have a problem involving power presses, you'll find the best answer at Clearing.



Color Movie—"A Better Way to Manufacture Shell Cases"—See new Clearing double end presses in action. This movie is available for showings in manufacturing plants or to technical groups. Write Advertising Dept., Clearing Machine Corporation.

CLEARING PRESSES

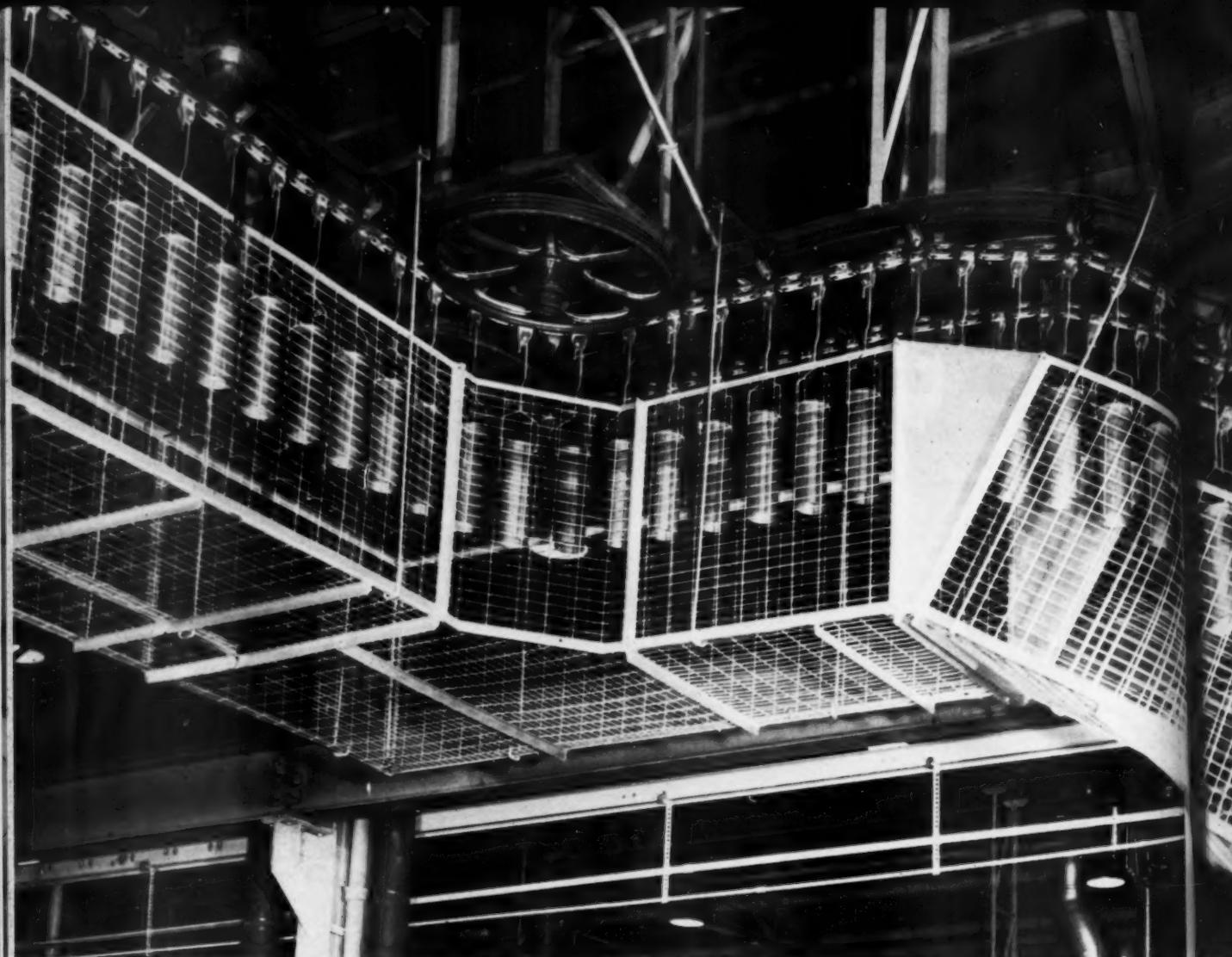
THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET • CHICAGO 38, ILLINOIS

HAMILTON DIVISION—HAMILTON, OHIO





Materials handling speeds defense

demonstrating how seven steel cartridge case production lines flow smoothly due to "keyed" production and handling facilities

by Gordon B. Ashmead



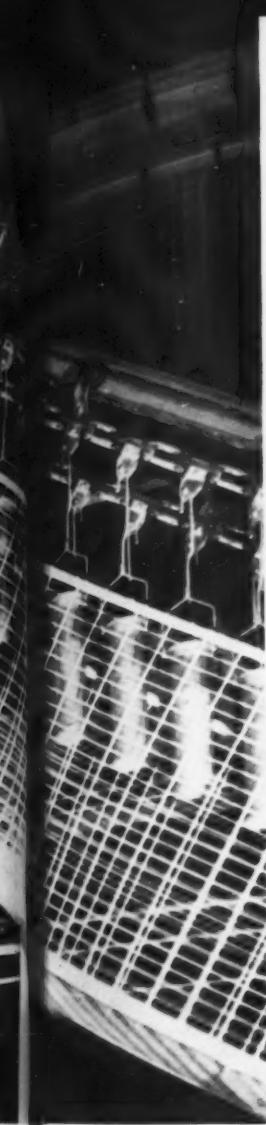
**DEFENSE
PRODUCTION
FEATURE**

The world's largest cartridge case plant would move at a snail's pace without its carefully planned mechanical flow of parts. It uses gravity, the force of the press ram, roller conveyors, rubber

belt conveyors, shuttle conveyors and overhead monorails, and, in addition, a system of lift trucks and two-way radio dispatched motorized trucks that take all the backaches from the operations. At no place in the manufacture does anyone have to lift more than the weight of a single cartridge case.

This Riverbank Ordnance Plant,

a converted World War II aluminum plant in central California, has seven almost identical production lines, and before the year is out it will have its own steel processing plant. In 1954, the plant will be completely integrated from spherodizing of mill plate to finished, packaged product that will back up our defense through both the Army and the Navy. The



One of many lines of monorail conveyors serving seven production lines at Riverbank Ordnance Plant, Riverbank, California. Prime contractor operating the plant for the Government is Norris-Thermador Corp.

new steel processing plant will care for not only Riverbank's needs, but will also supply the raw material for two other cartridge plants in the system of dispersed sinews of defense.

Steel cartridge cases for 105 mm shells are made from 1/2" thick plate in stock that is roughly 38" x 111". First sheared to strips, the plate is then blanked to 7" diameter discs. Each disc is inspected so that only visually perfect blanks go forward on the overhead monorail conveyor to washing-pickling, phosphatizing and soaping facilities, and then on the same system the treated discs begin their expanding trip through the press room.

This press room contains 59 assorted presses, for the cupping and

drawing and for nibbling. The half-million square foot production room also houses the annealing facilities that are part of each production line.

Presses are part of materials handling sequence

Movement in the closely knit press line is simplicity itself. While the pre-cupping and the cupping operations, that prepare the flat disc for the draws, are stacked on special hand trucks for transfer to the adjoining press line, most of the handling is part of the normal action of the presses. The down stroke of the ram in each of the subsequent draws pushes the drawn piece down through the bed of the press, through the draw die and out the bottom of the press.

The drawn pieces build up in a gentle "U" chute that delivers the cases to the nibblers, used to chew off the excess and generally ragged end of the case after the draw. Quality control inspection in the press room insures a low rejection rate at later stages of manufacture.

Controlled atmosphere annealing furnaces

Midway in the drawing operations it is necessary to clean and anneal the cases, and to this purpose the cases are loaded from the nibbler to hand trucks designed for that particular purpose. Arriving at the annealing furnaces which are controlled atmosphere type, the parts are loaded in racks made of a special steel alloy and on roller conveyors proceed through a wash rack before annealing. They are soap-coated again after annealing for better performance in the dies.

Before the third and fourth draws the cases are pre-headed, this being an operation for the next to the heaviest press in each press line. The function here is to flatten the rather rounded closed end of the case and prepare it for its final draw to specified wall thickness.

The case, after the combined third and fourth draw, is finish-headed and this requires the heaviest press of the line — 2500-ton. Rubber belt conveyors are fed from small lines that take production from both sides of

the giant presses and take the cases to the piercing press that makes the hold in the head for the primer.

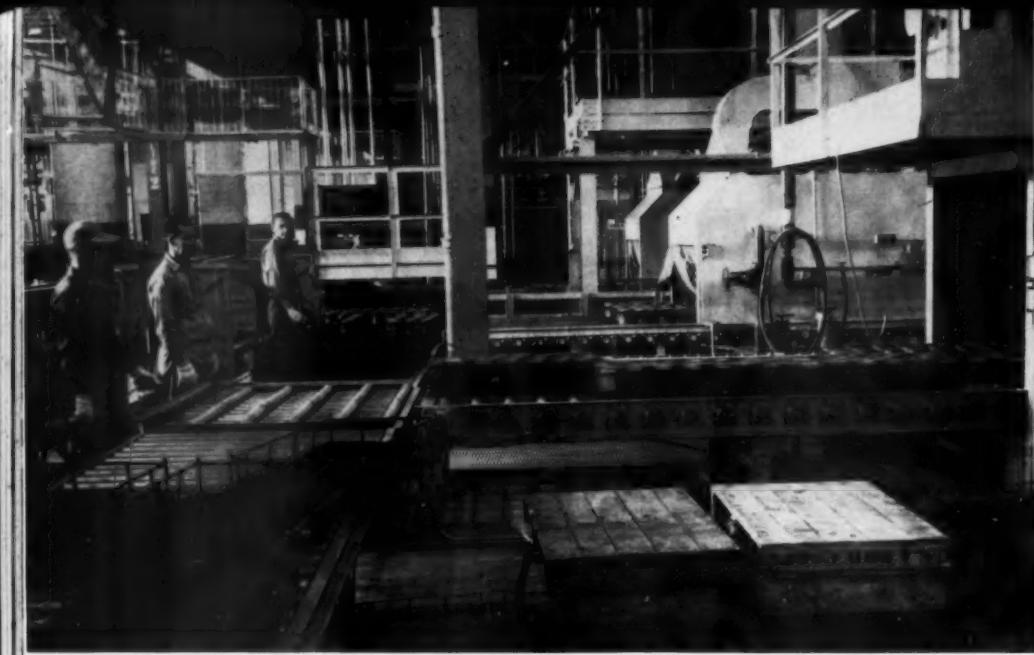
Pierced, the cases are hung on the overhead and begin the next to the longest trip in the plant — past washing and annealing locations to the taper preparation machines. The first of these is a battery of cartridge case lathes designed especially for the job. Here the heads are turned and the mouth trimmed, and as the cases are finished they are passed to an inspector who checks every case before placing it on the rubber belt conveyor.

This conveyor whisks the cases down the room to the beading machine and from there to the end of this line at the special equipment whose sole mission is to control the final dimension of the primer hole by reaming. Then the cases are ready for tapering done on a press that controls the mouth of the case within close tolerances that provide for the controlled escape of gases in its end use.

Continuous conveyorized finishing system

Final cleaning and drying is handled on another monorail, and then the cases are ready for their surface finish. This, too, is arranged by still another monorail. In this instance the case is held with two hooks, the first entering the primer hole and the second the open mouth of the case. Then the conveyor takes those cases on a roller-coaster-like ride through the phenolic varnish dip tank. Held in a horizontal position when it first enters the tank, the case after the first emersion in the phenolic loses the hook in the open end and it sways and "teeters" on the hook through the primer hole. The horizontal position permits the fluid to enter the full length of the case and the "teetering" permits the fluid's escape. Then the up and down motion of the roller coaster permits a "burping" action that releases any entrapped air within the case and assures a perfect coverage.

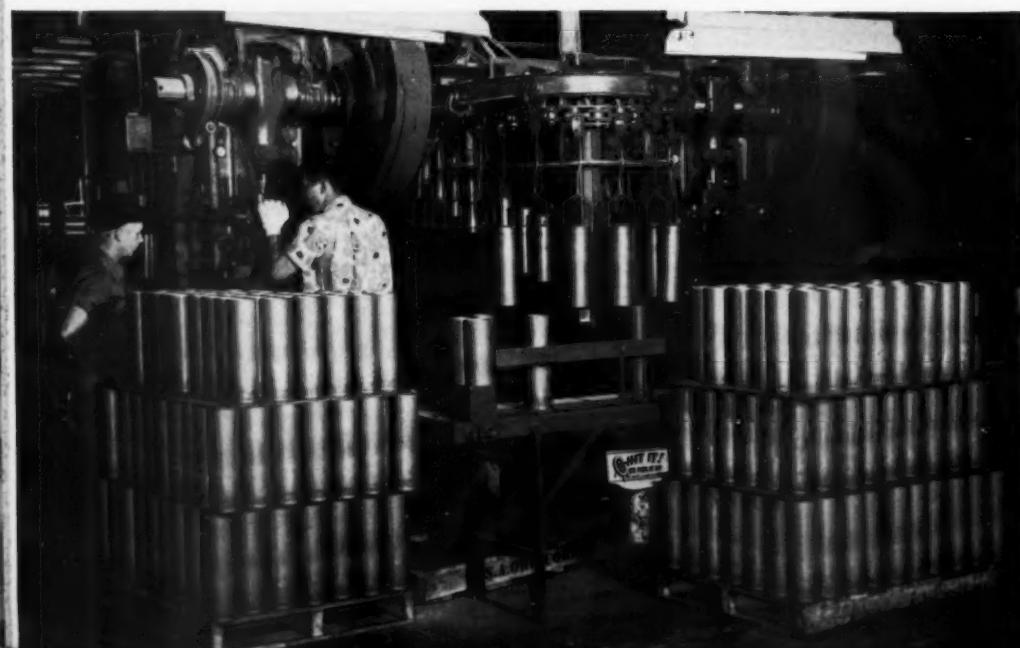
The dripping cases move over the static detearing grid as they leave the tank. Excess varnish is pulled



Parts to be run through annealing operation are placed in racks (left foreground), and are taken from through a wash (rack entering machine in background), and then into the furnace. As the racks emerge from the furnace, they are moved on a roller conveyor, like the one shown, to a machine for wash, pickle and soap coat, and emerge on the conveyor shown in the foreground. The parts then go back to the presses for the next drawing operation.



Cartridge cases move from the final heading press operation (Page 2) to the next operation (primer hole piercing) on rubber belt conveyors (foreground). Small conveyors feed into larger conveyor from both sides of press as operators remove cases from shuttle.



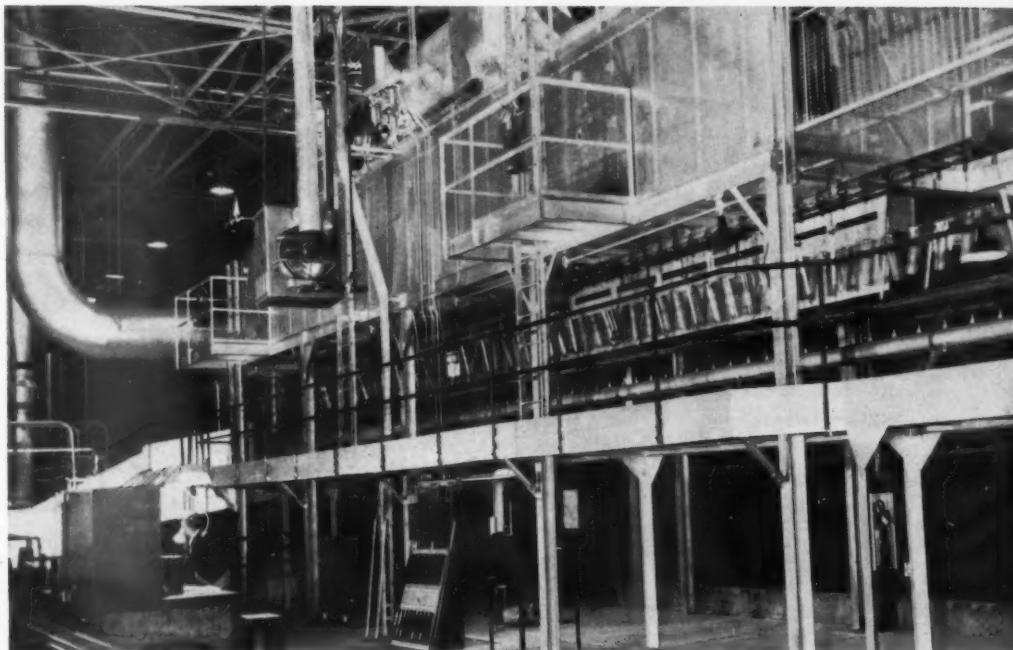
Cartridge cases arriving on conveyor from heading presses at primer hole piercing operation. After piercing, cases are loaded on the overhead monorail conveyor for transportation to the taper preparation machine.

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Head turning and mouth trim are performed on lathes on three of the seven production lines. The girl on the right performs a 100 per cent company inspection of the machined surfaces with gages. Cases passing inspection are placed on a rubber belt conveyor for transport to the beading machines further up the line.



After all machining operations, cartridge cases are thoroughly washed and dried and then placed on an overhead monorail conveyor which carries them through phenolic varnish dip. Upon emerging from the paint machine, the conveyor carries the cases over a static detearing grid (above, center) where excess varnish is pulled off prior to cases entering the oven (above) for stress relief and baking.



Cases are carried out of the oven to the final inspection station shown here. By the time the cases get to this point they have cooled enough to permit handling. A 100 per cent inspection is performed by the company inspectors (right), and a sampling inspection by Ordnance (left) at this station for final acceptance. From here, the cases go to a head stamping machine where nomenclature, lot number and date are stamped on the head. The cases are then packed nine to a carton and are stacked by lot number until approved for shipment.





Pressroom where inspected blanks brought to pre-cupping press by an overhead monorail conveyor. Blanks have been carried on this conveyor from inspection through washing, pickling, phosphatizing and soaping prior to arrival at this point. Movement of parts from press operation to another, and to annealing furnaces, is handled by hand carts like one shown in the foreground.

from the cases before they enter the drying oven for stress relief and baking. Then this monorail delivers the cases, cooled, to final inspection where 100% inspection is in force for the company and where sampling by Ordnance can okay final acceptance.

Accepted, the cases are head stamped by rolling lot number, date and nomenclature across the heads, and as the stamping operator unloads the machine the packing girl slips the cases, nine to a carton, in the final package that will also carry the lot number and date. The cartoned cases are placed on pallets and stacked for shipment as required.

This Riverbank Ordnance Plant is a Government-owned facility. The prime contractor operating the plant

for the Government is Norris-Therma-dor Corporation who, as Norris Stamping and Manufacturing Company, helped to pioneer the drawing of steel cartridge cases in World War II. Norris was one of half a dozen press plants who tried to draw steel as brass had formerly been drawn for cartridge cases.

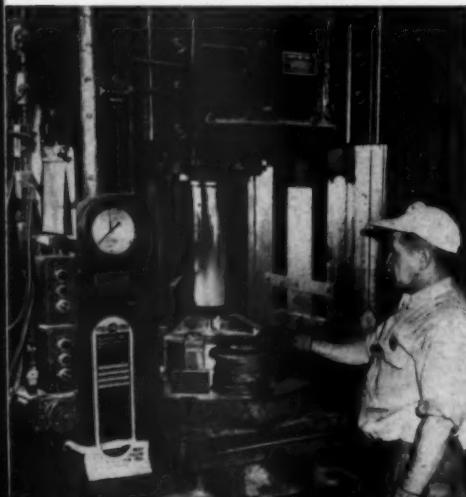
The lines at Riverbank follow the general techniques developed then but, of course, there have been many improvements. Press cycles have been made faster, press tonnage is no longer wasted, fast traverse on shuttle beds increase production, and combined draws like the third and fourth in the 105 mm sequence not only eliminate an operation but eliminate a sequence of handling.

But probably the greatest speeder

of production is the system of material handling that is in step with all the other production improvements. Every burden has been removed from the production man. His every move is a production move. Production speed is generally geared to press cycles but here press speed is so closely akin to an easy operating speed that they seem exactly matched as the operator or pressman loads and unloads in same motion.

Provisions have been made for breakdown so that, conceivably, most locations in the line could be switched to other lines by switching the conveyor lines. Nothing, seemingly, has been overlooked to make this Riverbank Ordnance Plant a success and a giant sinew in our overall defense pattern.

At this 250-ton press, the 7-inch discs stacked on the bed, are hand-fed into the die for pre-cupping operation.



Pre-heading is done on 1500-ton press. This operation flattens the head while keeping the walls in proper relation.



In final draw, walls are drawn to length in excess of 15 inches.

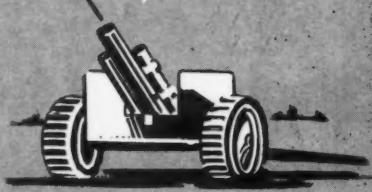
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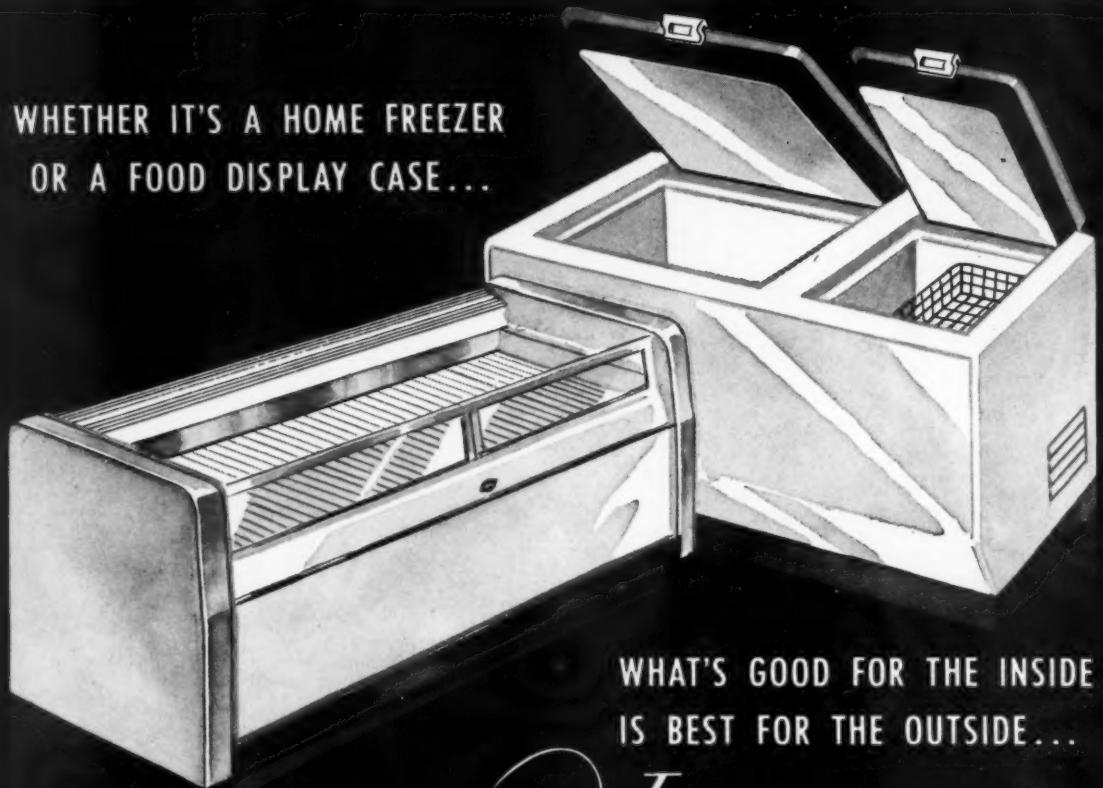
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OR A FOOD DISPLAY CASE...



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IS BEST FOR THE OUTSIDE...

PORCELAIN ENAMEL ON

U.S.S. Vitrenamel BASE

PORCELAIN-ENAMELED steel has long been used for the interiors of most fixtures like these. Now more and more manufacturers are finding that the same finish that gives such a fine surface for the inside is best for the outside, too.

Porcelain enamel on U-S-S Vitrenamel steel makes a permanent, durable, and beautiful finish that is easy to clean. Porcelain enamel is highly resistant to acid, heat and corrosion. It is noted for its ability to hold colors true, without fading, clouding or dulling.

To obtain the greatest durability and finest appearance for finished products, many enamelters have standardized on U-S-S Vitrenamel. The ideal base material, U-S-S Vitrenamel, is designed to provide a product possessing the essential chemical and physical properties, and having a surface texture that will insure maximum adhesion.

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TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



UNITED STATES STEEL

Design for salability— a key to industrial success

Part I—functional design—a major factor in the long range product-performance picture

by Dave Chapman • SOCIETY OF INDUSTRIAL DESIGNERS, DAVE CHAPMAN,
INDUSTRIAL DESIGN, CHICAGO

CONSIDERATIONS of design influence on product development are often broken into three categories — design for function, design for lower costs and design for salability. While each of these categories can be considered separately, the last — design for salability — actually embraces the first two and hits at the most immediate concern of the manufacturer or management executive.

In an intensely competitive market, the factor of design for salability can be the management key to industrial success.

Functional design is a major factor to be considered in the long range product-performance picture. Low production costs that allow for savings to the manufacturer that can be reflected in competitive pricing on the open market can also be achieved by capable design direction.

This comprehensive category—design for salability — couples the practical with the aesthetic approach. It takes into account, as well, the visual and emotional factors of response from the consumer public. It considers the *immediate visual impact*

for over-the-counter acceptance. It brings to the sales picture the advantage of customer satisfaction for repeat brand-sales based on aesthetically sound design principles as applied by the professional designer.

These are considerations in *fact*, not fancy. They are not the vague theorizing of the long-haired artist. They reflect a *logical analysis* of the process of preparing a product for sale in a competitive market.

Twenty-five years ago it would have been highly improbable that one individual would deal with both the

Automatic washer — The engineering department of Apex Electrical Mfg. Co., Cleveland, developed an automatic washer for Montgomery Ward & Co. with function and structure that required more than superficial design study. The upper half of the cabinet is not a shroud, but is itself a tub with sides formed on a tangent bender with a drawn and welded bottom. This tub is set on a structural chassis, and the shroud is added below with removable feature for service attention.

Dashboard detail — Control panel is on top, and therefore visually and manually simple in use. The dashboard also conceals the "vacuum-break" required by most metropolitan plumbing codes. Then, too, the controls are grouped in a small sub-assembly making the panel simple to produce and accessible for servicing. Dashboard is also adapted to semi- or non-automatic units, offering uniformity of product line.





Vacuum cleaner — The new Apex "bucket" cleaner was designed to meet changing demands of the cleaner market, and to extend the Apex line which already included upright and tank-type units. Design features include recessed handle to decrease apparent height, balance consideration to center weight for portability, large hand-size bayonet-type clamps on each side for easy removal of top.

aesthetics of design and the coldly calculated subject of salability. The fact that just such a thing is happening today reflects an advancing maturity in our growth as an industrial nation... The coupling of these two areas of product development now gives substance to the creed of the designer who is convinced that *good design will survive against bad in a free market.*

The man with the cash is getting choosy

Daily reports from the banking and credit associations, the stock market, business organizations and government officials tell us that the hey-day of the seller's market is past. The man with the cash in his pocket is getting choosy — and he has a full market of merchandise from which to take his choice. He can look over a field of ten refrigerators, ten carpet sweepers or ten kitchen ranges and know that the integrity of each of the manufacturers will vouch for satisfactory service from the unit. Aside from the operational "gimmicks" or special features of these products, then, he is going to buy the one that most pleases him — is most appealing, or "looks best" to him. *It is when this happens — when variation in mechanical excellence is reduced to known standards — that design moves into the picture.*

A new sales tool for industry

Mechanical excellence and a mastery of engineering problems have seen a high degree of refinement

since the industrial revolution. They have become accepted features of American merchandise. To that extent they have lost some of their punch as powerful sales tools. The issue, then, becomes clear-cut. A new way of selling must be found — and is logically being found in the application of the principles of good design to product development.

To clearly understand what we are discussing, it will be necessary to separate *STYLE* or *FASHION* and *DESIGN*. The terms are not at all

synonymous, although they occasionally overlap. It is important to analyze both inasmuch as both design and style are powerful sales tools and both have an impact on our culture.

Style may be considered as limited to the visual and use factors to which the consumer has been conditioned and which he accepts as important on face value. Superficial emotional connotations are attached to the style approach — "keeping up with the Joneses," implied security, mental laziness and the lack of the necessity of personal study and analysis. On a scatter-shot basis, style sometimes gives an astonishingly accurate index of real basic values.

Design is quite another thing, including in its analysis the net value of style, structure and function and implying some control over these factors on the part of the designer himself. By the nature of the aim of his skills — an aim toward salability — the designer may cover the fashion or style aspects. But more frequently the designer himself adheres rigidly to his philosophy and thereby creates new fashion or new style trends by the integrity of his structural and functional analysis.



Space heater — The microphone form is a natural answer for the design of this space heater for the National Die Casting Company. Fan is built into the tilting head mount on the diecast base. This appliance was designed by Dave Chapman, as were all appliances used in illustrating this article.

Mass producing the "metal" television tube

describing an outstanding engineering achievement and production operations
at RCA's "kinescope" plant in Marion, Indiana

(illustrated with finishotos)



(see reference to television tubes in editorial on page 13)



The Radio Corporation of America has developed a dramatic new use for porcelain enamel. This new use, amounting to the daily consumption of thousands of pounds of enamel, is the culmination of a long program of research, engineering, and manufacturing develop-

ment. The program was undertaken in an effort to develop a television picture tube which would improve performance while at the same time reduce manufacturing costs. This meant the type of construction employed must lend itself to mass production methods. Engineering studies had indicated that certain problems associated with the all-glass picture tubes would rapidly become more

acute with increases in tube sizes.

The substitution of metal for glass on the side walls of the envelopes would alleviate much of the difficulty, but presented a problem in making the glass faceplate, or viewing glass, adhere to this metal. An early solution was the use of 446 type chrome-steel (stainless), but this material was difficult to fabricate, was expensive, and in short supply. This metal,



Blasting the porcelain enameled shells free of enamel on the side of the metal opposite to the side to be sealed.



Loading shells into a degreaser to remove surface dirt and grease before going to sealing machines.

though used successfully, was eventually replaced by a less expensive and more easily worked stainless metal of lower chrome content known as 430 chrome-steel-modified for television usage (see *finish*, August, 1953, issue). Unfortunately, this material was also in limited supply.

The prospect of using enameling grade iron in conjunction with porcelain enamel offered many advantages if it could be made to withstand the manufacturing and operating loads

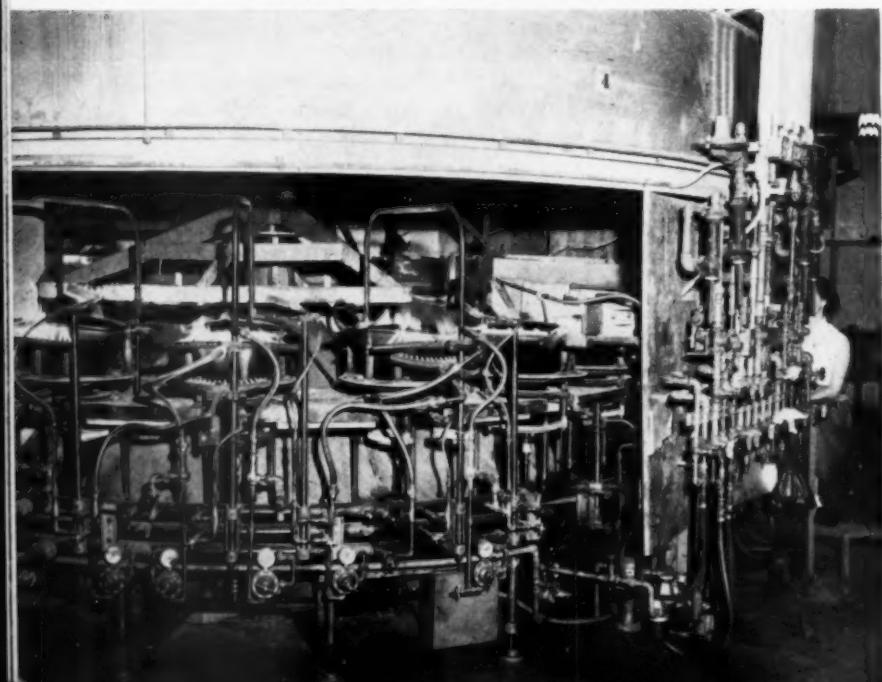
imposed upon it. RCA launched upon a very extensive development program and persisted against formidable obstacles until a commercially successful process was evolved. It is not the purpose of this paper to enumerate the difficulties encountered, but the enameling industry should recognize a service has been done it in the face of great difficulty. Even before the porcelain enameled iron shell technique was perfected, RCA proceeded with plans to construct a

plant to process the metal television shells.

A new plant for mass producing "kinescopes"

In 1949, RCA established a plant at Marion, Indiana, designed to mass-produce large screen metal shell "Kinescopes," as the industry refers to that part of the TV set we know as the "picture tube." At Marion it was proposed to manufacture the three principal types of picture tubes: the all-glass, the 430 chrome-steel (stainless), and the porcelain enameled iron tubes. Initially, emphasis was to be on the chrome-steel tubes,

A 16-head faceplate sealing machine with side panels removed to show the spindles rotating under gas-oxygen flames used to supply heat to cause melting of glass and enamel in forming seal.

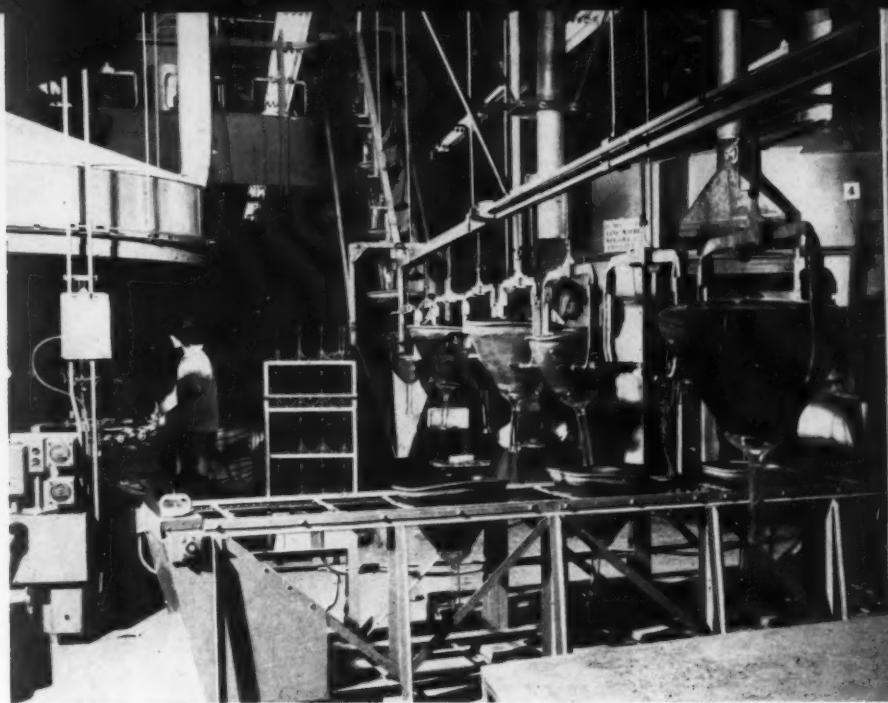


Black matt graphite coating being applied to inside walls of metal shell to provide conducting surface.





Spraying porcelain enamel on edges of stainless steel shells to serve as bonding agent between faceplate glass and metal.



Glass and faceplate sealing machine. Operator removes metal shell after having glass funnel sealed on by machine at left, transfers by short conveyor (center) to faceplate machine on the right.

passing to the porcelain enameled iron ones as soon as the engineering development section had perfected the technique of manufacture.

Subsequent events have amply justified the sagacity of RCA's appraisal of the potentiality of the metal-shelled tube. The special advantages of the metal tube construction has led to its rapid acceptance by the set manufacturers, a great number of whom are customers for RCA's finished tubes.

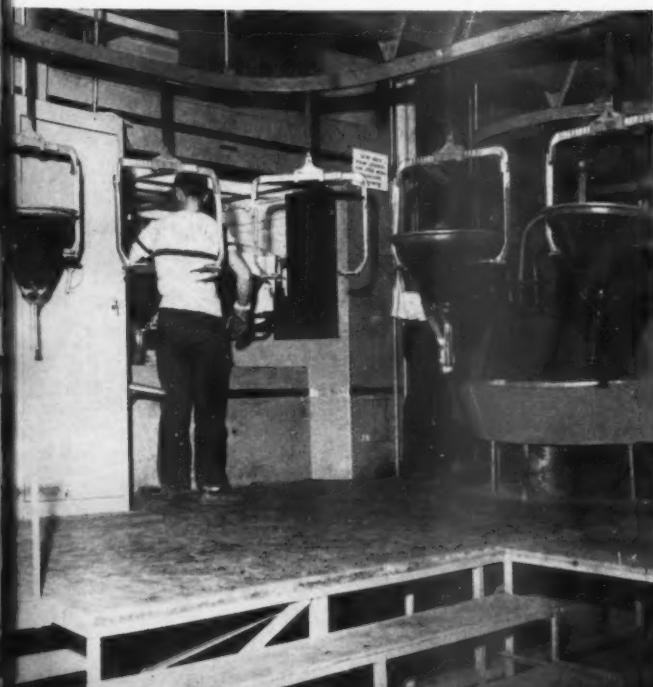
One of the advantages claimed for the porcelain enameled shells, in addition to lower potential cost, is that they require less space. This reduces

shipping and warehousing cost, and permits greater stocks to be carried within the plant proper. It also reduces the handling at the using stations, as one skid holds upwards to 120 metal shapes against 35 of the all-glass type. The metal shell is lighter and structurally stronger, thus permitting faster and easier handling with less danger of breakage. Should breakage occur, as in the case of implosion (collapse of the tube under vacuum pressure), there is less flying

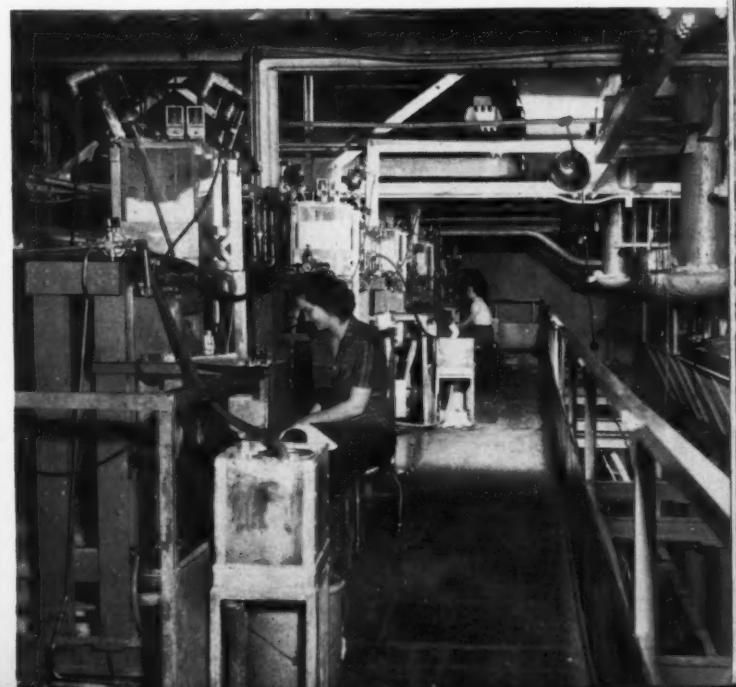
glass as there is no side wall glass, and the faceplate glass is thinner and loses momentum quickly. This reduces the danger area around an imploded tube considerably. The reduction in weight of the metal tube is an advantage in production, simplifying handling problems.

The metal construction permits the use of high-quality window glass as the viewing medium. This material does not distort the picture and may be viewed from a side angle without

Bulb washer sends jet of hot solution up into shell assembly. Acid solution used to remove all foreign matter from inside of tube.



Fluorescent screen settling machines with agitation tanks; measuring and charging operations on left (settling machine photo on Page 33).





Transferring 17-inch and 21-inch rectangular shell assemblies from the "bake-out lehr" to the service conveyor.

exaggerated distortion. The face of the glass can also be etched to reduce reflected light images from the room where the picture is observed.

The tube plant at Marion, Indiana, processes thousands of these 21" rectangular metal tubes daily. The metal shapes are received from the metal fabricators in the case of the chrome-steel shells, or from the enamelters in the case of porcelain enameled shells.

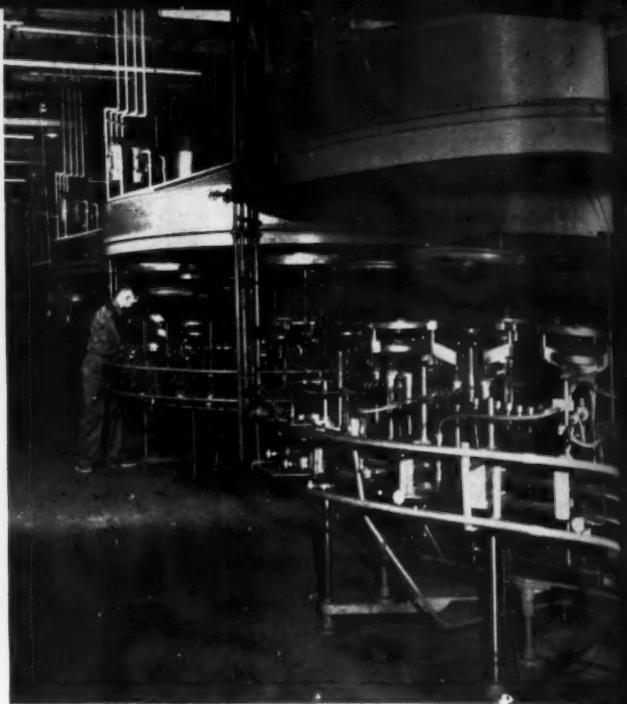
The shells are carefully checked for defects in the metal or enamel. The enamel is checked for thickness, to be sure it meets the rigid specifications in the sealing areas. The metal shapes are gaged to be sure

they meet shape specifications. The tubes may not be allowed to go out of shape during the enameling fire. Any tubes damaged during shipment are also rejected and routed to salvage.

Degreasing and abrasive blasting employed

Approved shells are trucked to the degreaser, where dirt and grease picked up during shipment are removed. The degreaser is of the liquid type having an endless woven wire

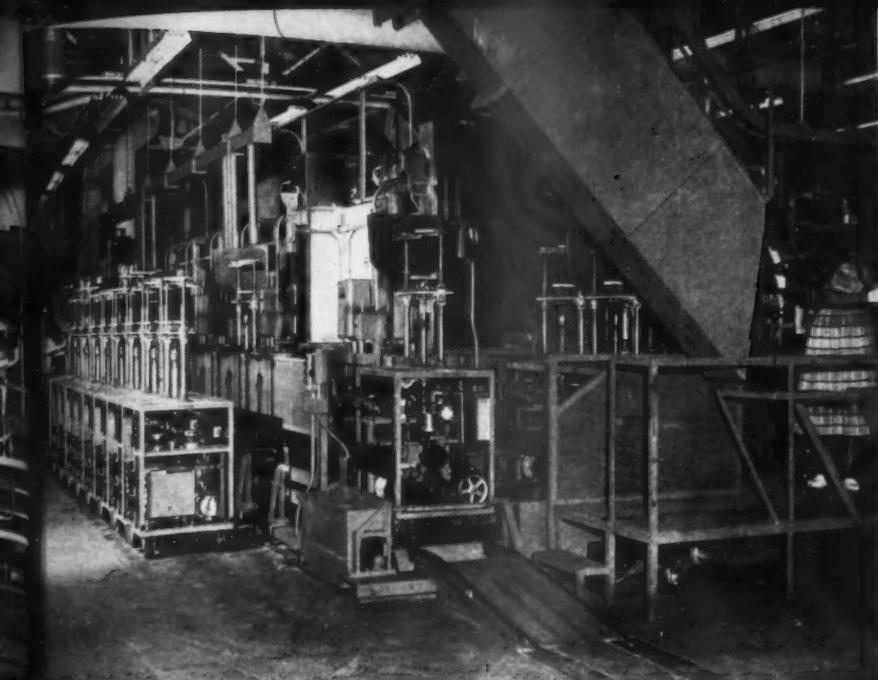
belt permitting continuous processing. In the degreaser the shells are subjected to several cleaning solutions in succession, and finished with a drying. The shells come off the degreaser clean and dry, ready for restacking on the skids. The shells are then trucked to the blasting operation, where they are placed on multiple-head machines. The blasting is carefully restricted to the reverse side of those areas where glass-to-metal union is effected; i.e., there is no enamel remaining on the oppo-



Sealing electron guns into cone assembly. Machine rotates past several stations where parts are heated to effect union, brought together, and the excess glass removed

Operator de-magnetizing completed tubes so that the electron beam will not be affected by magnetic influence.





One of several straight-line exhaust machines. Each tube is mounted on a "car" (at right, entering tunnel). Empty cart on left is being serviced. Carts have sliding contacts for picking up power to energize self-contained evacuating and heating devices.

site side of the metal from where the glass-to-metal seal will be made. The area of blasting is restricted to these locations by a thin rubber insert on the inside and a form on the outside. The sandblast nozzles are stationary and the shells revolve during the blasting. A coarse grade of aluminum oxide is used as the abrasive, as this has proved to be most efficient and economical. The blasted shells are returned to skids as they come off the blasting machine.

The chrome-steel shells, being proc-

essed somewhat differently, are inspected and degreased, and are blasted, but the blasting is done directly on the areas where the sealing will be done. This has been found necessary in order to completely clean the metal and control the formation of the seal. After cleaning and blasting, the chrome-steel shell receives a coating of material to improve the functioning of the completed tube.

The coated shell is pre-conditioned by heating, and is then delivered to the sealing area. Small spray booths are set up here to spray an enamel of special composition onto the seal-



Operator applying hand torch to tubulation to melt glass and cause it to collapse from vacuum within tube. Vacuum drawn to fraction of a micron pressure.

ing areas only. The shell is then passed by conveyor or directly by hand to the sealing machines. The porcelain enameled iron shells do not require these additional steps, but are delivered directly to the glass sealing machines from the blasting operation.

**Many RCA designed,
especially-built machines**

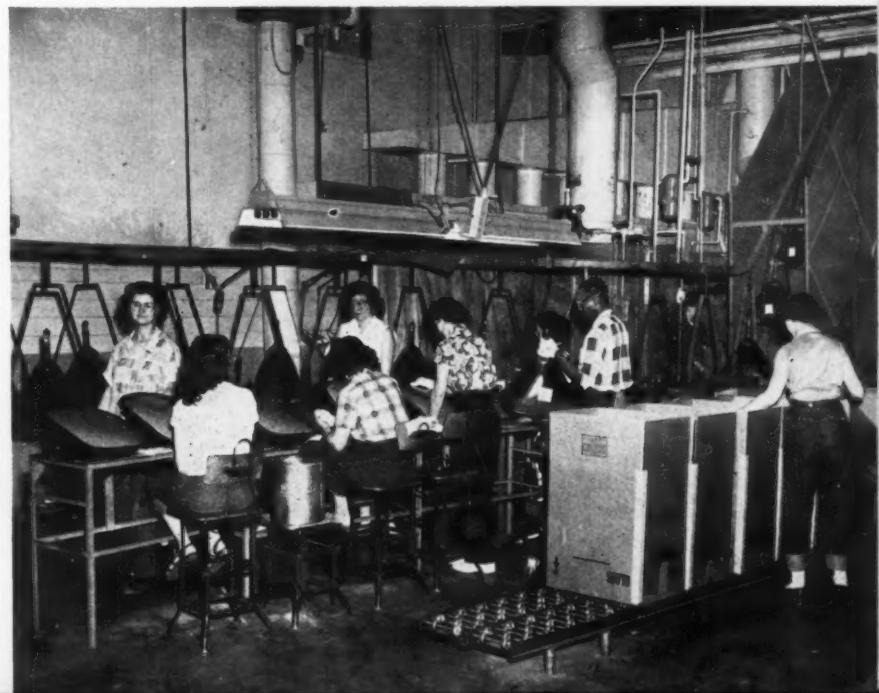
Up to this point the shells have received treatment of a nature not uncommon to the porcelain enamel trade, and on machines of a commercial design and obtainable on the open market, but from here on practically all of the equipment is of special design, made either by or for RCA, to perform the special operations involved in completing the shell

to Page 74 →

Left: Aging conveyor (overhead) where tubes are aged while voltages are applied to the electron gun to stabilize the electron emission characteristics of the tube. Test station in center.

Right: Faceplate cleaning and inspection, with packaging conveyor shown on right.

Packaging operations are shown in the Safe Transit section on page ST-3.





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New

Supplies and Equipment

J-10. Sander-polisher for sanding, filling, feathering and polishing

New A new translatory action sander-polisher, for sanding, filling, feathering and polishing metals and other surfaces, has two



counterbalanced heads which eliminate all centrifugal force, and give excellent hand finished results without swirl marks, scuffing or burning.

Special cups are available for all types of grinding, smoothing and polishing of base metals and other surfaces. Regular wiping cloths, chamois or wool may be used for

J-11. Cable-Link conveyor has no moving parts below the rail

New A new development in cable conveyors is based on the use of improved plow steel cable, cut to 16", 24" and 32" lengths, with steel buttons swedged on both sides. The swedged-button ends of the "cable-links" recess in the cavities of specially-designed mal-

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final finishing on high gloss surfaces.

Equipment weighs 8 pounds, and is available in either electric or air-operated models.

J-12. Equipment lubricating oil with added property of "tackiness"

New Kling-Oil is a #30 SAE lube oil with the added property of "tackiness." When applied to a bearing, the oil clings to the surface . . . does not drip or splatter, and maintains lubricity for long periods. One application per day is said to be ample to keep fabrication equipment functioning at top capacity and maintain cool bearings.

J-13. Nozzle for metallizing machine requires no manual adjustments

placed on 8", 16", 24" and 32" centers.

Service life of the new conveyors is said to be inestimable, since these systems have no moving parts below the rail, and very few bearing points otherwise. The .02 friction ratio on which the system operates is said to be another longevity factor.

The accompanying photo shows the new-type conveyor performing a radical vertical dip to save valuable floor space in a congested area. Parts carried on the conveyor are barbecue grilles.

J-14. Nozzle for metallizing machine requires no manual adjustments

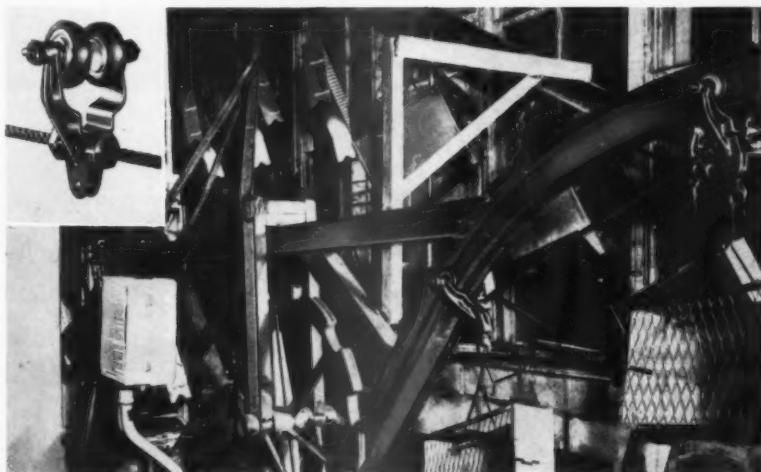
New A metallizing machine incorporating a new nozzle and other basic improvements has been announced. The new nozzle



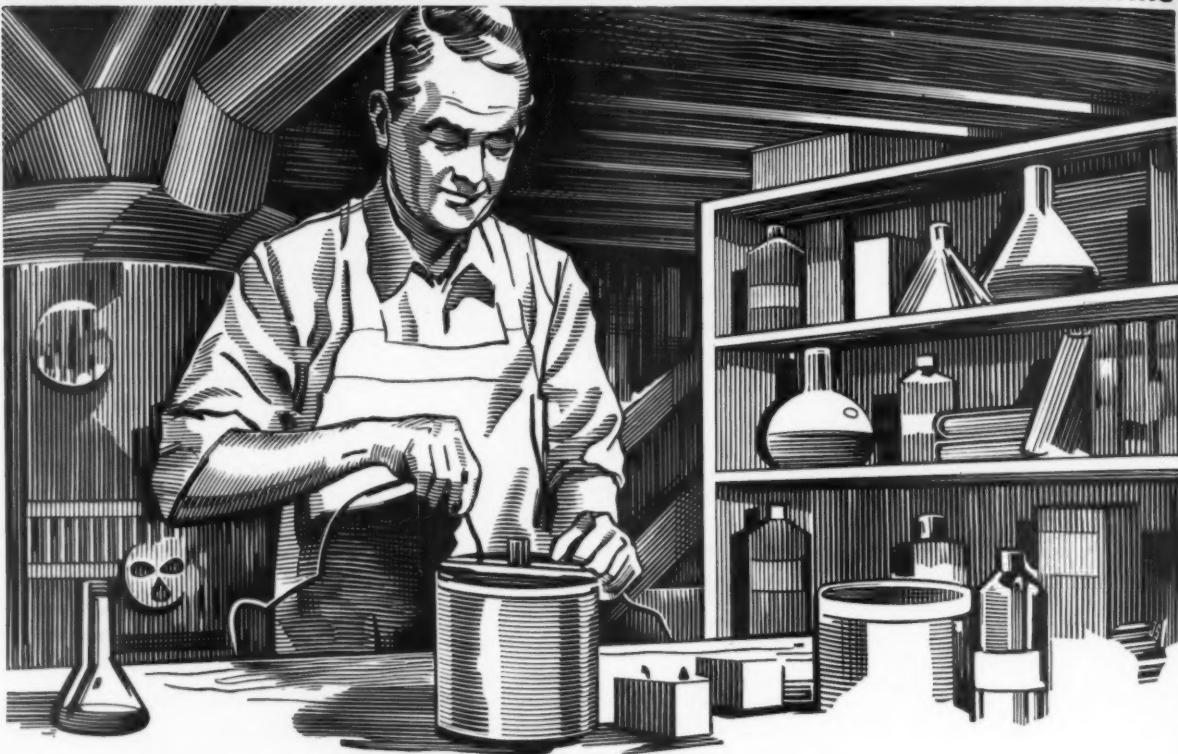
eliminates the need for manual adjustments by the operator, and assures an even flow of metal to the surface being metallized.

J-15. New metal cleaner for use in vitreous enameling industry

New A new metal cleaner, specially formulated for use in the vitreous enameling industry, is described as a medium-high alkaline compound containing very high wetting and penetrating properties. The new cleaner is said to meet the



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The infant Udylite Company, starting in a stockholder's basement, improved methods and techniques in applying the Cadmium. Through the years, the Udylite Corporation has continued to pioneer Cadmium. It developed the Ball Anode, Ball Anode Containers, the Brighteners . . . and has led every step of the way to the better rust prevention offered today in the newest Udylite Bry-Cad Process.

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This Udylite Cadmium Process is just one of many ways Udylite has pioneered in the electroplating field.

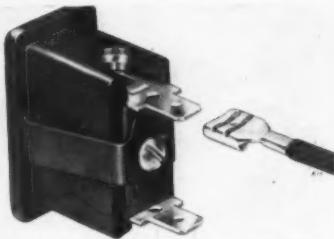
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following requirements: (1) cleans the work with no traces of soil, (2) provides maximum long life, (3) creates little or no sludge, (4) has high emulsification power, (5) affords low surface tension for thorough rinsing power, and (6) top cleaning efficiency even under hard water conditions.

J-15. Snap-in switches, outlets, load plugs for appliances, room coolers

New Snap-in switches, outlets, pilot lights and inter-connecting load plugs are now available with spade terminals for "quick con-

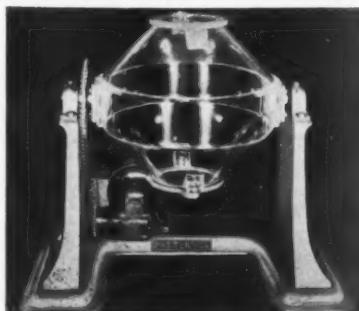


nnect" connectors as well as with standard screw terminals.

The units are instant-mounting devices designed to save man-hours on assembly lines in the manufacture of home appliances, air conditioning, ventilating, and many other types of equipment. They are simply pushed into mounting holes where spring clips hold them firmly in place.

J-16. Transparent dry blender

New This new laboratory dry blender is made of clear, rigid plastic, and provides the opportunity of studying: effects of changes



in blending times; effects of changes in consistency of raw materials; density differences; effects of size and shape of particles; general nature, such as adherence of particles to each other or to blender walls, particle breakage, etc.

J-17. Molded glass fiber insulation

New This new one-piece molded fine glass fiber pipe insulation has the following features: exceptional thermal efficiency, light



weight, flexibility, resilience, non-breakable, insoluble in water, cuts readily, one-piece 6-foot lengths.

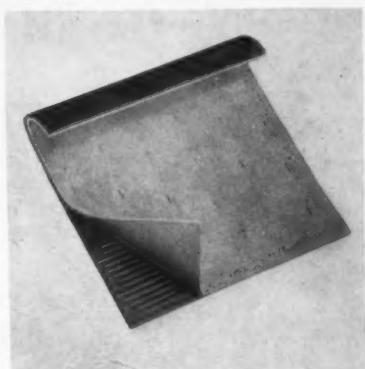
J-18. Rust-proofing ferrous metals by chemical-immersion

New Products treated by a new chemical-immersion process are reported to withstand standard salt-spray tests from 12 to 24 times as many hours as those treated by other methods. It can be applied in integral colors ranging from gray and black through blue, green and

olive drab. The treatment is also said to provide a base for bonding paint.

J-19. Protective packaging material

New This new packaging material for appliances and metal products combines the advantages of the outside shock resistance



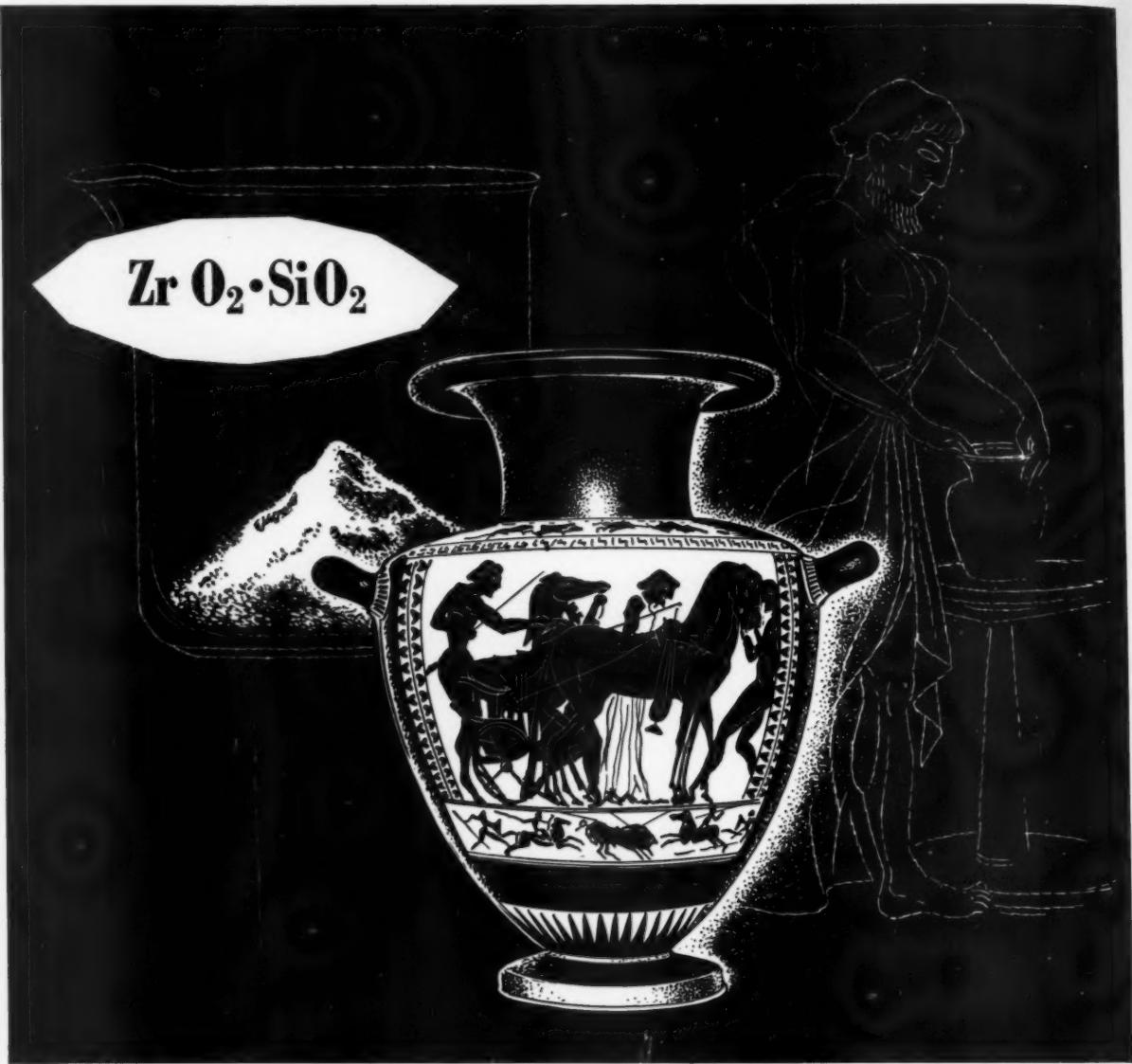
of Chippaflex flexible corrugated and the inside non-abrasive cushioning of Kimpak interior packaging. It is available in sheets, sleeves, built-up single-face pads, corner pads and corner posts.

J-20. Fork truck for use in narrow aisles, congested areas

New The "Cargo Scout" is a new electric-powered 2000-lb. capacity fork truck designed for fast operation in congested areas. It is designed for freight car and truck loading and unloading, and for operation in narrow aisles or on small elevators.

Principal features of the 3-wheeled unit include: end control for speed and convenience of operators who must get on and off the truck frequently; extra short wheelbase (43½") to permit turning in crowded areas; a specially-designed device to eliminate steering wheel kick-back; 68" high uprights and full initial lift to permit stacking in low head room areas; and heavy-duty drive axle to withstand high speeds and fast acceleration. The truck's contactor control





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New Industrial Literature

101. Movie on "Resistance Welding of Stainless Steel"

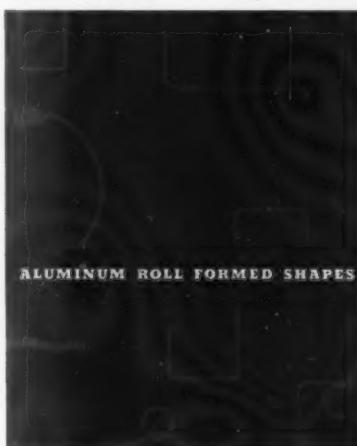
New A new motion picture "Resistance Welding of Stainless Steel" discusses spot welding, seam welding, projection welding and butt welding. It is a 16 mm sound and color film, making generous use of animation and drawings to clarify the regular picture material. Running time is 22 minutes.

It is available on *free loan* to readers requesting it on their *company letterhead*.

notching and nibbling, and speedy, accurate set-up.

105. Roll-formed shapes production described in new booklet

New Production of aluminum continuous roll-formed shapes—ranging from parts for clothes dryers to desk trim and awn-



ings—is described in this new booklet which explains the advantage of continuous roll-formed shapes.

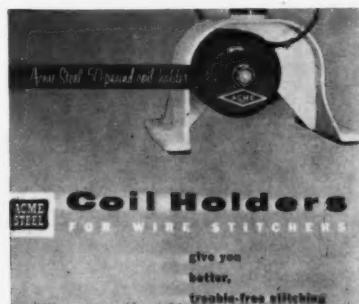
106. Booklet on ultra-sonic metal cleaning process

New A new technical folder describes the Soniclean process, an application of ultra-sonic energy for the cleaning of metal parts. Illustrated by graphs and diagrams, the folder describes in detail

the principles and methods used in the process.

107. Folder on coil holders for wire-stitching machines

New The construction and design of a 25 lb. coil holder which mounts on the machine and an adjustable floor model, designed



to hold two 50 lb. coils, are explained in detail in this folder. Information on use of stitching machines is included.

108. Bulletins on Porcelain Enameling of Aluminum

New A series of three technical bulletins on porcelain enamels for aluminum are now available. Technical Bulletin #2000 gives the broad picture of this new material. Bulletin #2001 gives a step-by-step account of the procedures to be taken from the selection of the aluminum alloys through the application of the enamel and the correction of enamel defects. Bulletin #2002 describes the pretreating and cleaning processes so vital to the satisfactory bond of the enamels on the aluminum.

FINISH
360 N. Michigan Ave.
Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No. _____ No. _____ No. _____ No. _____

No. _____ No. _____ No. _____ No. _____

Name _____ Title _____

Company _____

Company Address _____

City _____ Zone _____ State _____

104. Catalog on fabricator for punching, notching, nibbling up to 165 strokes a minute.

New This new catalog (first edition) describes and illustrates a sheet metal fabricator for punching, notching and nibbling up to 165 strokes a minute. Outstanding features of the fabricator are rapid interchangeability for punching,

new weapons for fighting . . .



HEAT and CORROSION

Research has accomplished much

article I (October, 1953)

Silicone finishes for high temperature applications.

When we see a modern appliance on the sales floor or in the home, or a coin-operated machine, a piece of metal furniture, a cabinet, a bathtub, or even a metal casket, we are prone to think of the finish (if we think of it at all) as a means of beautifying the exterior for use and for salability.

There is another factor of at least equal importance in the relationship of a "finish" to the metal product — its qualities for resisting corrosion and, in many cases, heat as well. There can be no more important feature of *any* metal product than its finish — the feature that people *see*. That's why manufacturers, from president to the man in the shop, learn to respect the importance of the finishing department.

article II (November, 1953)

High temperature ceramic coatings and their application.

During recent years there has been a great deal of research in all types of coatings for the specific purpose of developing greater HEAT and CORROSION resistance for both conventional and specialized products, and for both commercial and industrial applications.

article III (December, 1953)

Cermet coatings—possible answer to ultra-high temperature problems

finis h has reported these developments as progress is shown. With this issue is started a series of three articles pointing up this progress in the continuing effort to master the harmful effects resulting from extreme conditions of heat and/or corrosion. We welcome reader comment or suggestions for the development of later editorial material on the subject.

Water tank and powerhouse stacks still look new one year after being coated with black, yellow and gray finishes based on air-drying silicone resins. Exposed in part to temperatures as high as 450° F., as well as weathering in a chemically-laden atmosphere, they show no sign of fading, cracking, peeling or chalking.



Silicone finishes for high temperature applications

by R. C. Hedlund • PAINT LABORATORY, DOW CORNING CORPORATION, MIDLAND, MICHIGAN

SINCE the introduction of silicone resins a few years ago, they have won wide recognition as vehicles for heat stable, corrosion resistant paints. Prior to the use of silicone resins, maintenance men had found it almost impossible to protect equipment exposed to corrosive atmospheres and to temperatures of 400° F. to 1000° F. Organic finishes on these applications failed in a few weeks or months.

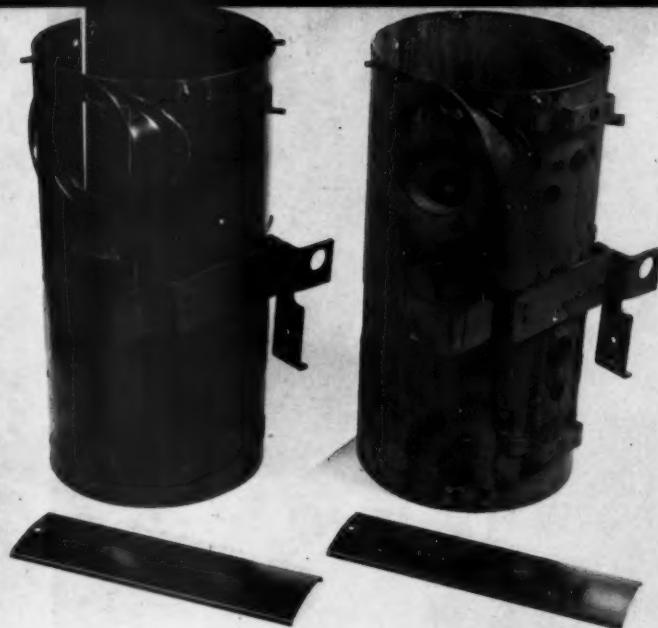
finish OCTOBER • 1953

In the oil fields of the Southwest where salt air combines with heat and chemical fumes, silicone paints have demonstrated their ability to give from ten to fifty times the life of the best organic finishes. As a result, thousands of dollars have been saved in the maintenance and equipment costs.

The primary property of silicone based paints is this ability to resist both heat and corrosive conditions.

Conventional organic aluminum paints can be formulated to withstand temperatures approaching 1000° F., but upon exposure to weathering will soon fail to give the desired protection.

Silicone paints are similar in appearance to conventional paints and can be applied by brushing or spraying. For maximum durability, they require baking of the film either prior to use, or during operation of



COURTESY SOUTHWIND DIVISION, STEWART-WARNER CORP.

the coated equipment. Temperatures of 300-400° F. are required to polymerize the resin sufficiently to give corrosion resistance. In some applications where the corrosive conditions were not severe, air-dried coatings have given excellent service, but silicone paints are generally not recommended for low temperature applications.

Thorough metal cleaning — a necessity

Surface preparation is also important to obtain the maximum properties from silicone paints. Because of the lack of polar groups in the silicone molecule, the adhesion of silicones to steel is poorer than conventional oil modified finishes. Thus, sandblasting of the surface will greatly improve the durability of silicone paints and is highly recommended. The removal of all organic paint and loose scale rust is necessary if satisfactory paint life is to be obtained. In general, if good cleaning practices are followed, silicone finishes will give excellent results.

A number of silicone resins are available to the paint formulator for use in high temperature coatings. The type of resin required depends largely on the flexibility requirements and the maximum operating temperature. The various resins available differ primarily in their flexibility and rate of curing. The more flexible type resins have the most heat stability and weather re-

Ordnance heater shell shown on left was sprayed with olive drab modified silicone paint and baked 30 min. at 400° F. The other was sprayed with conventional olive drab. Both shells were subjected to 400° F. for 4 hrs. Organic coating was then exposed to salt spray for 100 hrs., the silicone for 300 hrs. Panels in foreground show how finishes looked before testing.

introduced which appears to greatly improve the high temperature resistance of silicone paints. This new resin has double the thermal life of the best previous silicone resins, and appears especially useful in the 600-1000° F. temperature range. The new resin is very flexible, and in aluminum formulations will dry tack-free at room temperature.

The most widely used industrial silicone finishes have been the aluminum pigmented paints. These paints have been used at temperatures as high as 1000° F. with satisfactory results. At temperatures above 700° F., metallic pigments are necessary to obtain satisfactory bonding of the paints to the metal surface. Because of the ease of application and the bonding properties of aluminum paints, they have been preferred to other metallic based finishes. Zinc dust formulations have also been used and have given excellent heat and corrosion resistance.

In our laboratory work, we have found the pigment concentration to be an important property in the corrosion resistance of silicone aluminum paints. Indications are that for the best results, the aluminum content should be 30-50% of the paint solids. Thus, a paint containing one part aluminum paste to one part of silicone resin solids will have much

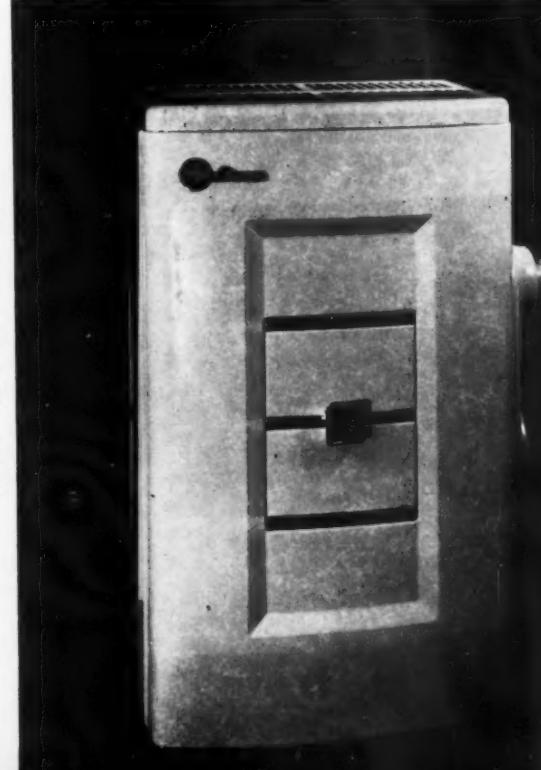
to Page 107 →

sistance. They can be used either alone or modified with the harder, faster drying resins. The harder, more brittle and faster curing resins do not have good weather resistance when used alone, hence are blended with the flexible resins to give a wide range of physical properties. The harder resins will also promote better chemical resistance because of their more highly cross-linked structure. A blend of 60% of the harder resins with 40% of the flexible types has been used widely with excellent results.

New resin doubles thermal life

Recently a new silicone resin was

COURTESY MOTOR WHEEL CORPORATION



Modified silicone finish on this Duo-Therm space heater was tested for 500 hrs. at 450° F. without showing discoloration, checking or powdering. The coating has a pencil hardness better than 5H. It will take an 180-degree bend on 20 ga. steel over a 1/8" mandrel, and will also withstand a concave impact test of 30-inch-pounds.



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AMERICA'S first aluminum scraper—the 410-foot, 30-story Alcoa Building in the heart of Pittsburgh's Golden Triangle—was dedicated September 15, marking completion of the lightest building for its size ever built.

Begun in May, 1950, the Alcoa Building claims more building innovations than any other structure of

modern times. Its exterior walls are sheathed with hundreds of 6' x 12' aluminum panels. Its aluminum windows — roughly four feet square — are reversed for cleaning from inside the building (weather is kept out by means of an inflatable rubber tube recessed in the window's aluminum frame).

Completely air conditioned, the

building's offices are heated and cooled from aluminum ceilings. All electrical wiring and most of the plumbing is aluminum, as are lighting fixtures, elevator cabs, partition framing and many thousands of pounds of interior trim.

The Alcoa's Building's 4½-story glass and aluminum entrance — separated from the sheer 410-foot tower—



ft: The
the in
e sky at
ulti-color
p

is built from the top down. Framing members are suspended from two huge cantilever beams which jut out at the fifth floor level. A rooftop aluminum cooling tower—largest of its type ever constructed—cools conductor water for refrigeration equipment which air conditions the building. Building designers have used several types of marble to complement major uses of aluminum inside the building. Executive offices, rooftop board room suite, reception foyers on most floors and many administrative offices have been custom furnished in the most modern contemporary styling.

Designed by Harrison & Abramovitz, New York, the Alcoa Building was constructed by George A. Fuller Co., New York and Pittsburgh. Two Pittsburgh architectural firms—Mitchell & Ritchey and Altenhof & Brown assisted in the design.

Metal magic with porcelain enameled aluminum

FACING material that can turn a steel skeleton into a working example of modern architecture in a few hours—pliable metal that can be curved vertically to a two-foot radius—or an expansible facing that can be adapted to building conditions without cutting and fitting—this product, this material performs a metal magic. This product is Zourite manufactured by The Kawneer Company, Niles, Mich.

Zourite is porcelain enamel fused at just under 1000° F. to alumilited aluminum. With a corrugated profile rolled from .050 aluminum stock, the material has inherently strong

and clean lines. After firing, the color runs permanent with a medium gloss. Kawneer manufactures six colors of porcelain enameled alumilited aluminum; sunset red, academy blue, harvest brown, spring green, velvet black

Porcelain enameled Zourite can be seen underneath and beyond the alumilited aluminum panels used on the distinctive exterior of the Alcoa Building.

Left: The parapet breezeway of the Alcoa Building shows how the interior walls use Zourite exclusively. Blending with the sky at the East and North side of the building are the multi-colored walls. On the south wall—the near wall in the photo—is a solid sheet of dark blue color.

and alumilited grey. Any color can be manufactured to specifications.

On a flat surface the plane of application is framed with trim members at every corner. Where the material is applied vertically, strips of furring channel are screwed, nailed, or riveted horizontally to the surface to be covered. Once the area is framed and the furring channel applied, the hard part of the job is done. Simply by using clips which are inserted into the furring channel, strips of Zourite are applied to the surface. These clips resemble a half-clenched, three-fingered hand. The two outside fingers are pushed down to secure the strips at each junction with the furring channel. Metal blocking under the Zourite prevents buckling.

A wash with soap and water about every six months will preserve the surfaces.

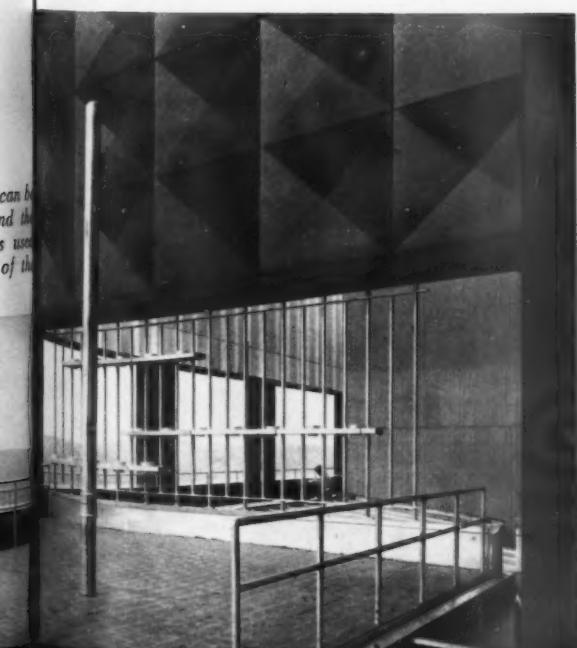
The widest use of Zourite is on commercial buildings — store service outlets, or offices.

A most recent dramatic use of the material is presented photographically. It is represented by the colorful parapet breezeway atop the new Alcoa Building, Pittsburgh, Pa.



Above: Standing atop the Alcoa Building looking down into the parapet, one can see the extensive use of porcelain enameled aluminum. On near walls three shades—light blue, white and dark blue—were used. The far wall is a solid shade of blue—the color most frequently used through the parapet.

Below: Alcoa Building's 4½-story main entrance stands in striking contrast to the entries of most modern office buildings. Note the monorail for carrying hoist and maintenance cab to serve this unusual building feature.





YOUR LITHIUM HORIZON

As the production gears of the new Foote lithium chemical plant at Sunbright, Va., mesh with those of our Kings Mountain raw material unit, vastly increased quantities of lithium chemicals will go into industry...for ceramic bodies, glass and porcelain enamels...for multi-purpose lubricating greases...for air conditioning...for welding rod coatings...and for numerous other important industrial products.

With Sunbright coming into production—the future is bright with lithium. Now is the time to project your plans with Foote...lithium.

FOOTE MINERAL COMPANY

412 Eighteen West Chelten Building; Philadelphia 44, Pa.
RESEARCH LABORATORIES: Berwyn, Pa.
PLANTS: Exton, Pa.; Kings Mountain, N.C.; Sunbright, Va.

phase 4:

Foote's new lithium chemical plant

This plant at Sunbright, Va., is designed to double the productive capacity of the entire lithium chemical industry.

phase 3—Pilot plant operations of an exclusive lithium process developed by Foote.

phase 2—Kings Mountain, N.C.—Mining largest known deposits of spodumene.

phase 1—Continuing Foote research...finding new and improved uses for lithium chemicals.



Announcing
a complete and integrated service on

porcelain-enameling of aluminum

*for the first time... Competent Counsel and End-Product Research
to fit this new process to your business*

*for the first time... A Plant Engineering and Design Service to
assure efficient, low-cost operations*

*for the first time... A Complete Line of Production-proved Frits
and all other materials you will need*

*for the first time... Field Specialists to train your personnel in all
production phases of the process*



FERRO CORPORATION • Cleveland 5, Ohio

Now...to all the advantages of

aluminum

you can

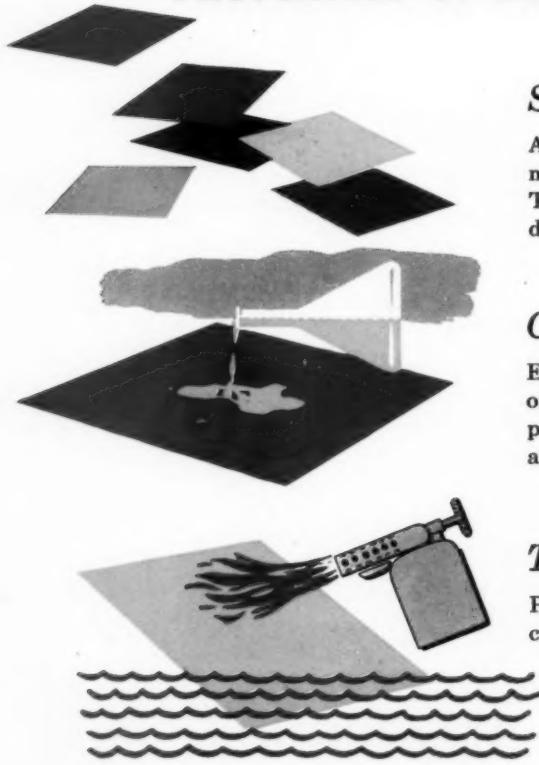


The "wedding" of two *lifetime* materials—*Aluminum* and *Porcelain-enamel*—can well revolutionize a host of businesses, bring major changes to a number of industries.

Wherever *appearance* is important, users of aluminum will want to take a good hard look at this new development. And users of other metals, too, will do well to investigate the potentials in this new combination of materials. To the lightweight and anticorrosive qualities of aluminum can now be added the sales stimulating power of *color*. Color as permanent as the metal to which it is fused.

A wide range of colors are yours to choose from in this new porcelain-enameling process. Flat sheets, formed shapes and castings can be thus treated. Even *welded* assemblies can be porcelain-enamaled.

PROPERTIES OF PORCELAIN-ENAMELED ALUMINUM



Surface Texture and Color

Almost any degree of surface reflectivity is possible, from dull matte to extremely high gloss. Surface variations are innumerable. There is no limitation to the range of light-fast colors . . . and the durable "glass-like" finish minimizes maintenance requirements.

Chemical Resistance

Exposure to strong detergents causes no staining, streaking or loss of color. Resistance to acids, alkalis and sulfides is excellent, comparable to other porcelain enamels. Coatings are relatively unaffected by salt water.

Thermal Shock

Panels heated to 1,000° F., then plunged into cold water, show no cracking or flaking of the porcelain-enamel surface.

you can add lifetime color

Strength

Porcelain-enamel adds rigidity to aluminum. For instance, a thin coating of porcelain-enamel will add more than 50% to the rigidity of a .019-inch aluminum sheet. And this coating is fused into the metal. Production economies and weight savings can thus be obtained by using a minimum metal thickness and taking advantage of this "strength" characteristic of porcelain enamel.

Fabrication

Porcelain-enamaled aluminum can be sheared; can be cut with abrasives, band or hack saws; can be drilled or punched (with little or no marring of the porcelain-enamel surface and no subsequent rusting or spalling). Limited forming may be done after firing of the porcelain-enamel coating. Substantial economies will be effected by many fabricators by using sheets of standard dimensions and cutting, punching, drilling, etc., to finished requirements *after* porcelain-enameling (in fact, in some instances, right on the job).

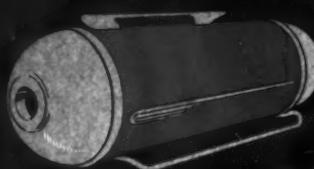
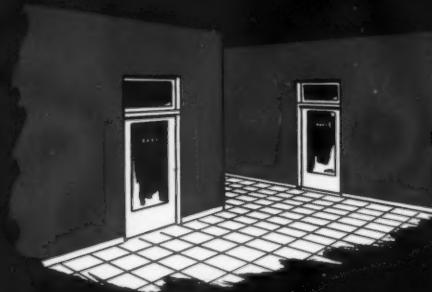
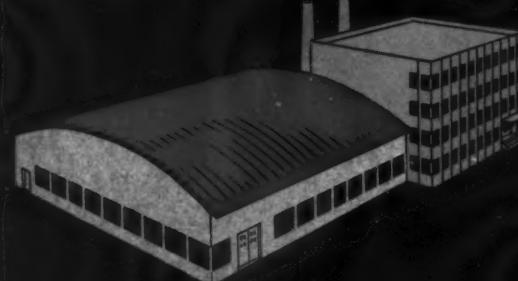
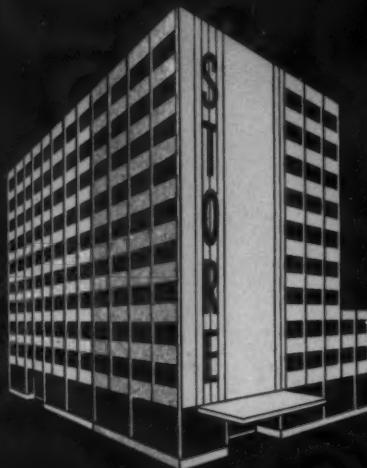
Welding

Porcelain-enamled aluminum of any thickness can be welded on the reverse side without discoloration or damage to the enamled surface. Porcelain-enamel can also be easily applied over welds.

Dielectric Strength

Porcelain-enamel has a voltage breakdown rating of 500 volts per mil thickness, making it suitable for many insulating and shielding purposes.

Highlights of the new process for porcelain-enameling aluminum will be found on the next page. For further details, write Ferro Corporation, Porcelain-enamel Div., 4150 East 56th Street, Cleveland 5, Ohio.



O.D.100
F-1953



HIGHLIGHTS

of the new process for Porcelain-enameling

ALUMINUM

Aluminum Stock

Porcelain-enamel finishes can be applied to wrought 61S, 2S and 3S aluminum alloys, also on nonporous castings of 43 alloy. For extrusions 53S, 62S and 63S alloys can be used. Degree of temper of the metal appears to be no factor in its enameling properties.

Metal Cleaning

A clean, active surface free from grease, oil and excess oxide is necessary for the process. Metal cleaning can be accomplished by a 15-minute immersion in a metal bath, followed by thorough rinsing and draining of the metal.

Chromate Bath Treatment

All alloys (except commercially pure 2S and 3S) must be given a "pretreating bath" in a hot solution of chromate and caustic. Upon removal, the metal must be promptly washed to halt chemical action.

Pre-Firing

After the chromate bath and rinse, the stock is pre-fired to a temperature between 700° F. and 1,000° F. This pre-firing renders the chromate salts insoluble so they do not bleed through and discolor the porcelain-enamel.

Preparation of "Slip" ... or "porcelain-enamels in solution". Following recommended formulas, nec-

essary materials are weighed out and mixed, then milled for 6 to 10 hours by the enameler.

Porcelain-Enameling

A ground coat and at least one cover coat are recommended for most products. After the ground coat spraying, articles should be thoroughly dried in an oven unless they can be immediately charged into the enameling furnace. A temperature of 970—1,000° F. is used for firing all coats, simplifying this phase of production. After the ground coat is fired, articles should be cooled to room temperature before applying the cover coat. Similarly, a second cover coat (usually of another color) can be added. Multicolor designs can be obtained by the squeegee or screen stencil process and several colors fired simultaneously.

Accelerated Spalling Tests

This test is essential to good quality control and provides a quick, accurate check on the ability of the porcelain-enamels to adhere to the metal under weathering conditions.

Porcelain-Enameling Furnaces

The "firing" of porcelain-enameled aluminum has been found to be the most critical part of the process. Temperatures must be held uniform throughout large areas of the furnace and maintained at a predetermined figure within 5 degrees plus or minus. To meet this need, Ferro's Engineering Division has developed an entirely new, electrically heated furnace for this specific purpose.

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Plan to attend the BRAB-PEI Conference on *Porcelain-enamel in the Building Industry*, Washington, D. C., Nov. 12 and 13.

MORE
ON
GETTING
A BETTER
START FOR
YOUR
FINISH

An outstanding NEW etchant for

ALUMINUM

Pennsalt AE-16

non-sludging • non-scaling • long-lived • time-saving • money-saving

Good news for fabricators! With Pennsalt's great new etchant—AE-16—you can give aluminum a beautiful satin finish *without* experiencing the usual headaches of sludge and scale—and at considerable lower cost than with *any* equivalent product!

Here's a case in point: A leading aluminum fabricator ran a side-by-side production test with AE-16 and an old-style etchant. After nine weeks, the original tankful of AE-16 had formed no sludge, was still performing satisfactorily! The old-style etchant had to be dumped and recharged twice in the same period.

Of course, AE-16's non-scaling characteristic means reduced tank maintenance costs, also. The AE-16 tank was cleaned by merely flushing it down with a hose—no chipping, no shoveling of rock-like scale.

AE-16 is a quality etchant In from one-half to ten minutes at normal tank temperatures, it produces a smooth, even, satin surface that easily conceals

die marks and surface flaws. Few additions are required to keep up its working strength, and you'll find Pennsalt's method for determining the concentration exceptionally easy to follow.

All this means less down time, trouble-free operation, lower maintenance costs, increased production. Yet, even with its many advantages, *AE-16 actually costs less than any comparable product on the market!*

AE-16 is part of a complete aluminum preparation "package" Pennsalt now offers to fabricators. To help you use these excellent materials with maximum efficiency, Pennsalt also offers a Metal Processing Service, staffed by specialists in this field.

Further Information—on AE-16 or on any of the other products in the Pennsalt "package"—is yours for the writing. Address: Metal Processing Service, Pennsylvania Salt Manufacturing Company, East: 288 Widener Building, Philadelphia 7, Pa. West: 2168 Shattuck Ave., Berkeley 4, Calif.

finish OCTOBER • 1953

The Pennsalt Aluminum "Package"

Pennsalt Cleaner A-27: A new all-purpose non-etching cleaner that thoroughly removes all tough soils, including red and black marking inks. Rinses quickly and completely, even when allowed to dry on the work. Will not streak or stain.

Pennsalt Aldox*: A new powdered, acid-type desmutter and deoxidizer. Replaces nitric acid, does away with carboys and fumes.

Pennsalt Cleaner #85: An alkaline cleaner and deoxidizing agent recommended when aluminum is coated with a heavy layer of oil.

Pennsalt Cleaner MC-1®: An unusually economical general-purpose deoxidizing-type cleaner.

Pennsalt Cleaner EC-51*: A non-staining, organic-type emulsion cleaner.

Pennsalt Cleaner EC-54*: An emulsion cleaner which will not boil off, evaporate, or flash at use temperatures.

*Trade Name of PSM Co.





THE first bowls, plaques, ash trays, and wall decorations ever to be made using vitreous enamels on sheet aluminum have been designed and executed by Edward Winter, according to this leading Cleveland artist.

Winter pioneered large copper enameled bowls and murals in 1931, and in 1934 produced what is said to be the first vitreous enameled steel mural decoration. His large bowls in luminous enamel on sheet silver were an innovation in the 1952 Cleveland Museum of Art May Show.

To date this artist has produced countless panels and murals on both sheet copper and steel for interior as well as exterior decoration. His commissions have included public buildings, filtration plants, restaurant fronts, offices and laboratories, and U. S. Government post offices.

The introduction to the national market of these new enameled aluminum utilitarian art objects and murals shows the wide range of color.

Vitreous enameled aluminum as an art medium

Cleveland artist pioneers in decorative accessory and mural field with colorful enamels on aluminum



Above: Edward Winter with some of the first vitreous enameled aluminum art objects and panel produced. Winter visualizes the use of aluminum with colorful enamel glass in a tremendous future in architecture, particularly for construction (staterooms, lounges, bars, dining rooms) where light weight, color, sign permanence and frequent qualities are desired.

*Left: Winter places some
the first vitreous enamel
aluminum bowls and plates
in the furnace where they remain
for a period of six minutes.
These art pieces received
to four separate firings.*

texture and design now possible in this medium.

Color is king

These new enamels are smartly designed and highly styled, using beautifully saturated color tones such as chartreuse, carnation pink, dove gray, cerulean blue, forest green, crystallian black and white. Hundreds of other colors and tones are possible with special metallic oxides.

While the modern enamel technician can readily produce plain color work, the design of shapes and applied designs and decoration is normally expected to come from the hands of an experienced artist or designer.

Winter has used the same ingenuity in designing these aluminum pieces that he has shown in his copper and steel pieces. Continuing in the use of his sgraffito technique he has produced spontaneous white line drawings through a matt surface of black enamel. His colors have richness and quality, making the objects suitable to any modern decor.

Enamelled aluminum will not be competitive with copper or steel, in the opinion of Artist Winter, but will complement these other metals. Aluminum has unique characteristics of its own, being light in weight, flexible, and non-corrosive. Its impact and thermal shock resistance make it ideal



for home use, and for architectural decoration, says Winter.

Another advantage of sheet aluminum and enamel for architectural work, and murals particularly, is that portions of the bare metal can be ex-

posed and polished to a bright finish.

Light weight "curtain walls"

Architectural panels for curtain wall construction, and large decorative

to Page 88 →

bove: The Cleveland artist using his sgraffito technique while designing the first vitre-enameled aluminum bowls, trays and plates. The line drawing is scratched through a surface of black or colored enamel.

ght: Thelma Frazier Winter, wife of Artist Winter, pictured with some of the first vitre-enameled aluminum art objects produced. Colors are chartreuse, carnation pink, cerulean blue, forest green, black, white and gold. Heavy gauge aluminum was used, and the edges highly polished.



Porcelain Enamel Institute

15th annual forum for plant men

A NEAR-RECORD number of technical and plant men gathered at the Ohio State University, in Columbus, Ohio, in mid-September for the 15th annual Shop Practice Forum sponsored by the Porcelain Enamel Institute.

This year's forum was developed under the able leadership of W. H. Pfeiffer, of Frigidaire Division of General Motors Corp., and chairman of the 1953 Shop Practice Forum Committee.

The opening session was presided over by Prof. R. M. King, of Ohio State, who introduced Gordon B. Carson, newly-appointed dean of the University's College of Engineering.

In his first "welcoming address", Dean Carson urged his audience of technical men to avoid "going down the technical road alone." He stressed the importance of progress through cooperative research and the pooling of technical know-how.

W. A. Barrows, of Barrows Porcelain Enamel Co., and president of the Porcelain Enamel Institute, presented the response to Dean Carson's address of welcome. In his address, Barrows paid tribute to the Institute's central office staff which "kept a lot of us in business during the past three years" when some critical materials were in short supply.

REPORTS FROM INDUSTRY

The first day's technical session was given over to 5-minute reports on the progress and present status of topics of current interest to the enameling industry. Some of these reports are published in this issue, beginning on Page 63.

Edward Mackasek, Institute man-

aging director, reported on "Industrial Applications of Porcelain Enamels". He mentioned that more and more, industrial designers and processing engineers are looking into the engineering properties of porcelain enamels. He mentioned many new fields in which porcelain enamel coatings are being used, including food and beverage processing, petroleum, distillation, piping, air conditioning, and electrical.

Extending life of furnace tools

Ben Sweo, of Ferro Corporation, presented T. F. Moeller's paper on "Extending the Life of Furnace Tools

with High Temperature Coatings."

The report stated that high temperature coatings materially reduce oxidation, thereby increasing the life of alloy tooling, and also reducing the burden of re-operations caused by such scale.

Prepared neutralizers

James B. Willis, of Pemco Corporation, presented results of a survey on "Prepared Neutralizers."

In a survey of 18 plants, ranging in size from box furnace operations to multiple-continuous furnace operations, it was found that prepared neutralizers are being used daily in

Group photo taken on steps in front of Archaeological Museum, at The Ohio State University, where the 1953 Shop Practice Forum was held.



the production of all types of ware common to the enameling industry.

Several advantages listed as common to all prepared neutralizers, according to the survey, include: greater convenience in storing and handling; less possibility of error in weighing out materials; more uniform behavior of the neutralizer, and lower cost.

Hot process screening colors

In a report on "Hot Process Screening Colors", Robert G. King, of Vitro Mfg. Co., discussed a new method of squeegee application made possible by the development of thermoplastic mediums.

These mediums are solid at room temperature, but at increased temperatures the medium becomes fluid. The method has already proven successful in the glass industry at a working temperature of 160-200° F. King stated that the screening paste can be heated to this temperature and screened on the porcelain enamel where it will solidify immediately.

BALL MILL GRINDING

A symposium on "Ball Mill Grind-

ing" was presided over by W. H. Duvall, of Chicago Vitreous Enamel Product Co.

Papers on the use of high density mill balls, and the relation of milling practice to enamel workability, were presented by J. B. Vernetti, R. J. Baker and R. S. Sheldon, all of Frigidaire Division of General Motors.

In addition, the following men presented short reports on their experiences with high density grinding media: Lew Farrow, Clyde Porcelain Steel Division of Whirlpool; Floyd Bailey, of A. O. Smith; E. F. McDonald, Ingram-Richardson; Norman Stolte, Enamel Products; and Ray Noel, Porcelain Metals.

The reports all indicated that the relatively new high density grinding balls were effecting important economies in mill room operation. In one particular instance, it was pointed out, "22% more charges per mill lining life" were achieved through the use of high density grinding media.

PROCESSING METHODS

A session devoted to "Processing Methods in the Enameling Industry" was presided over by J. L. McLaugh-

lin, of *finish*, and chairman of the PEI Process Development Committee.

At this session, J. J. Baker, of International Harvester Co., presented a digest of a comprehensive study on "Spraying Methods and Equipment". A preview of this paper was published in September *finish*.

Graining methods

The subject of graining was discussed by J. P. Schloffman, of Challenge Stamping & Porcelain Co., who summarized the methods and equipment used in producing a grain decorative finish. He said that this decorative effect is used at present mostly in the home heating appliance and table and cabinet top industries, and is the duplication of wood grained surfaces on porcelain enamel.

In graining sheet iron or cast iron enameled ware, it is possible to apply the grain to either a fired enamel surface by wet graining, or to an unfired enamel surface by dry graining, Schloffman pointed out.

SPECIAL TECHNIQUES

E. E. Howe, of Chicago Vitreous Enamel Product Co., presided over a



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session on "Special Techniques and Applications."

Flow coating

The flow coat application of porcelain enamel was discussed by F. W. Nelson, of A. O. Smith Corp., who described flow coating as a process "whereby porcelain enamel is applied to the ware by flowing a stream of slip over the surface to be coated."

Pieces of cylindrical design were mentioned as being especially adaptable to flow coating. A water heater shell, for instance, can be coated in 16 seconds by this process.

Nelson said that the largest pieces to be flow coated at A. O. Smith were three jet propulsion tubes for simulated V-1 robot missiles. These tubes were 10 feet long, with a 20-inch diameter at one end, tapering to a 15 inch diameter at the other end. Specifications called for the coating of both the inside and outside of the tubes with a high temperature ceramic coating.

PRACTICAL TEST METHODS

Another session was devoted to

"Practical Tests in the Porcelain Enamel Industry", and was presided over by A. L. Friedberg, of the University of Illinois.

G. H. Spencer-Strong, of Pemco Corporation, served as leader for a panel consisting of E. C. Aydelott, of Murray Corp. of America; J. T.

Note:

On following pages are presented four of the papers given at the session devoted to 5-minute industry reports.

Roberts, Crane Co.; and R. B. Taylor, of Westinghouse Electric Corp.

A feature of this session was an exhibit of equipment for testing adherence, resistance to abrasion, and torsion testing. An added attraction was a Westinghouse color film on torsion testing.

ARCHITECTURAL PORCELAIN

A symposium on "Architectural Porcelain Processing" was presided over by Wesley Reynolds, of the Erie

Enameling Co. Members of this panel included H. W. McMahan, of Texlite, Inc., and Herbert Larish, of Seaporcel Metals, Inc., substituting for Paul S. Cecil, of Seaporcel.

During this symposium it was brought out that 18 plants are currently engaged in processing architectural porcelain, with the top manufacturer doing approximately 70,000 square feet per month.

Discussion centered around problems in obtaining flat, smooth surfaces; factors involved in color control; and weather resistant matte finishes.

ANNUAL BANQUET

At the annual banquet, held at the Deshler-Hilton Hotel, in Columbus, Robert G. Calton, of Chicago Vitreous Enamel Product Co., and a past president of the Porcelain Enamel Institute, reminisced on "Our Industry—Then and Now." Another featured speaker at the banquet was J. R. Pat Gorman, a Washington attorney, who presented a stirring address on "The Magic Key to Success".

Pumping vitreous enamel slips

by George N. Tuttle • BENJAMIN ELECTRIC MANUFACTURING COMPANY

THE handling and circulating of porcelain enamel slips has long been a problem in our industry, particularly in regard to maintenance of pumps. The advantages of circulating ground coat dip vats have been proven over the years, and are well recognized throughout the industry today. Furthermore, the use of mechanical equipment can appreciably reduce labor costs for conditioning of ground coat dip vats as compared with the manual operation.

Impeller-type pumps have not proven satisfactory due to the extreme abrasive action of enamel slips on bearings and packings, resulting in high maintenance costs. The development of special rubber-lined pumps, operating on the rotorstator

principle, represented a great improvement but left much to be desired from the maintenance cost viewpoint.

Within the past several years a new diaphragm type pump has been developed which gives promise of reducing excessive pump maintenance costs. It is the purpose of this brief article to discuss some details of the operation of this pump, and attempt to evaluate this equipment based on our experience over the relatively short period of time this pump has been in operation.

Briefly, the pump consists of an eccentric on a horizontal shaft to which are attached at 180 degrees connecting rods or power arms which actuate the 1/4-inch rubber dia-

phragms. The enamel slip is thus forced alternately clockwise and counter-clockwise through the piping system for every 180 degree rotation of the shaft. Valve action for the control of the slip flow is accomplished by the use of gravity action, vertically-mounted check valves made of approximately 2 inch diameter rubber balls. Two valves are used on the suction side and two on the pressure side which open and close alternately as the diaphragm is depressed or returns to the vertical position of the cycle. As the pressure on the diaphragm is released, the upper check valve closes by gravity and the lower check valve opens, allowing the enamel slip to refill the fluid chamber for the next cycle. →

"MAGIC CHEF INC.
GRINDING TIME WAS CUT FROM
6½ TO 4¾ HOURS BY
CHANGING TO..."

Coors High Density Grinding Balls!"

...Mike Bingesser, millroom foreman,
Magic Chef, Inc.

Mike Bingesser, millroom foreman, Magic Chef, Inc., pictured above, tells how he cut frit milling time from 6½ to 4¾ hours, simply by changing to COORS Alumina Ceramic Grinding Balls.

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- Pure White — No Color Contamination
- Smooth Surfaces — Easy Cleaning
- High Strength — No Chipping or Cracking

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"Magic Chef" inc. cuts milltime and contamination ON EVERY BATCH!

"We now grind 3,400 pounds of frit down to 2 grams fineness on a 200 mesh screen in 4½ hours with COORS Alumina Ceramic Grinding Balls. With previous grinding media it took 6½ hours.

"With previous grinding media, we added 30 pounds of 3" balls every charge that ran 6½ hours. This would have amounted to 7,500 pounds of balls used during the past nine months. Running the same size mill and frit batch with COORS balls, we have not added any balls during this nine months period. The COORS balls are as nice and round as the day we put them in our mills.

"We are operating a 100 pound mill and a 3,400 pound mill charged with COORS Alumina Ceramic Grinding Balls.

"Also, we now are using the COORS balls in a 6,000 pound mill. On the first load, we cut grinding time about 3 hours."

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The rated capacity of the pumps now being manufactured is approximately eleven gallons per minute and can be supplied with a 1/4 or 1/2 hp motor, depending on the conditions of the particular installation. Production on a new larger pump with a rated capacity of 25 gallons per minute will start in the near future.

While our experience with this equipment has been confined to its use as a ground coat dip vat circulating pump, there is factual evidence

that its use can be extended for the pumping of enamel slips from mills to overhead storage systems with the same low maintenance cost savings. Tests conducted by an independent testing laboratory indicate that the pump develops sufficient pressure to pump enamel slips from the mills to a height of approximately 40 feet.

In conclusion, after eight months experience with this equipment, it appears that maintenance costs will be considerably lower than on other

type pumps previously used. The simplicity of the pump design eliminates all wearing parts from direct contact with the abrasive action of the enamel slip. One pump operating 16 hours per day for a period of eight months has required no maintenance whatsoever other than a monthly cleaning. Based on the operating experience with the original test model, the life of the rubber diaphragms is at least two years.

Gyratory screening of enamel slip

by J. A. Disario • SMOOT-HOLMAN COMPANY

WE in the enameling industry are always working toward the end of a physical and chemically-clean enamel slip. From my study of data on "gyratory screening", accumulated at the O'Keefe and Merritt plant by Mr. Leahy, I'm certain that gyratory screening can be an aid toward that end.

Gyratory screening is nothing more than a "foundry riddle" slightly revised for our type of material. It is a yoke-type unit with a shaft driven by an eccentric fly wheel that has a rotary oscillating motion, and a circular screen attached to the base.

Features of the gyratory screening unit studied include the following:

1. Time saving. For example, it takes 15 to 20 minutes to discharge a 1000-pound mill of white cover coat passing through a magnetic separator into a gyratory unit and through an 80-mesh screen. Screens can be changed very readily to accommodate various slips.
2. Simplicity of construction. The motor and working parts are set well above the screen. The unit is easy to maintain.
3. No artificial pressure used. Therefore, contaminants or frit par-

ticles cannot be forced through the screen, resulting in a cleaner slip, and longer screen life.

4. Screen size. Large surface area handles flow of material without clogging or overflow. Oscillating motion provides for constant flow through screen.

Based on results to date, the use of a gyratory unit promises the advantage of removing even greater amounts of foreign materials through the use of finer mesh screens.

From the features studied, it appears that benefits mentioned can provide for better material controls.

One-coat gray speckled titanium enamels

by H. L. Latimer • THE MOORE ENAMELING & MANUFACTURING CO.

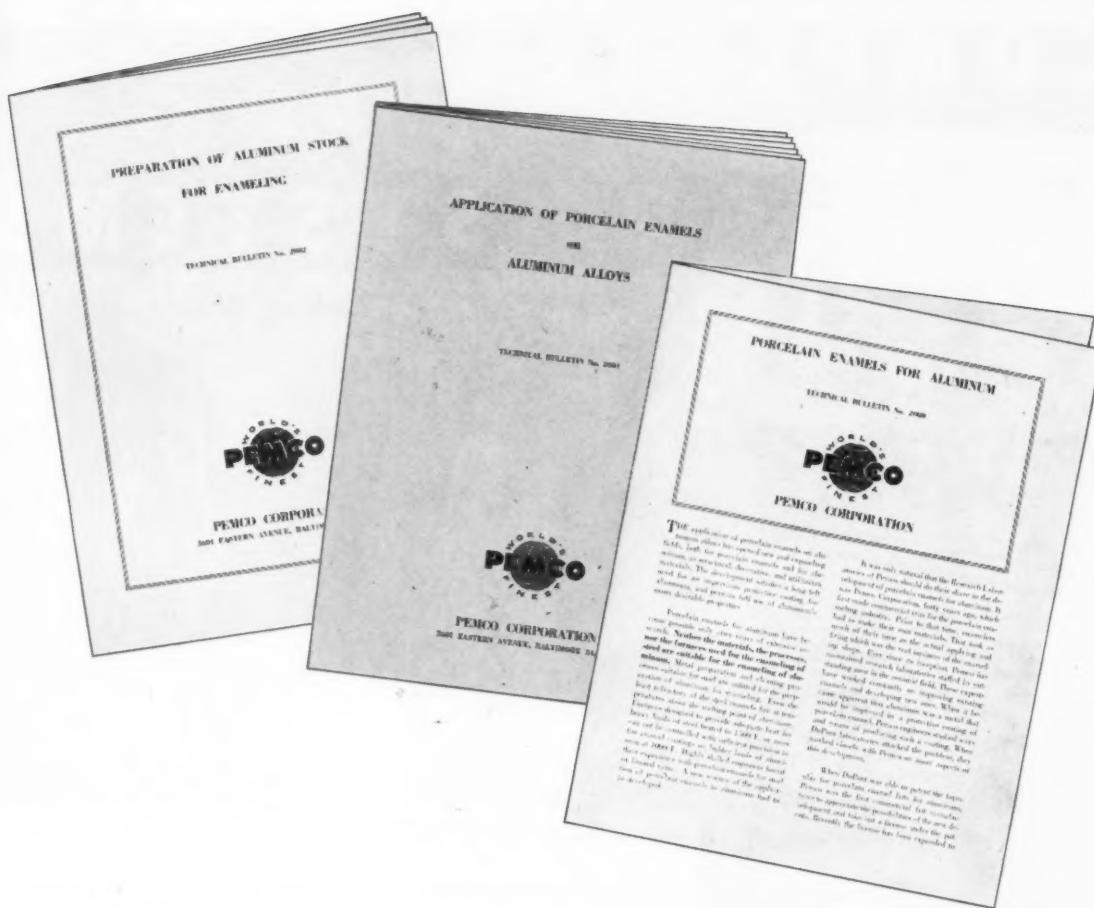
ONE-COAT gray speckled titanium enamels were first introduced as an improvement and replacement for the mottled gray antimony enamels. This new one-coat gray speckled titanium enamel not only produced a better product, but also eliminated the complicated, costly manufacturing mottling process, for which no change had been satisfactorily devel-

oped since the foundation of this industry shortly after the middle of the last century.

As a composition, gray speckled titanium enamels are a blend of titanium frit and a blue ground frit, milled together with a suitable mill addition. We have found that the amount of titanium frit should not exceed 50 per cent, because loss of

good bond would be the result with an excessive amount.

Although the blending of cover coat frits with ground coat frits may seem unorthodox, enlarged photomicrographic sections show that, during the firing process, a migration of cobalt to the steel-enamel interface produces a strong union between steel and enamel. →



GENTLEMEN . . . we're ready for your questions on enameling aluminum

Just off the press are three comprehensive technical booklets on porcelain enamels for aluminum. Bulletin #2000 is a general picture of the uses, properties and production of enameled aluminum. Bulletin #2001 is a handbook on the steps to follow in applying porcelain enamels to aluminum. Bulletin #2002 covers the clean-

ing and pretreating of the aluminum for enameling. Send for any or all of these authoritative booklets. Pemco, pioneer manufacturer of commercial frits, has prepared this data as a service to forward-looking enamelters and aluminum fabricators interested in this vast new field.

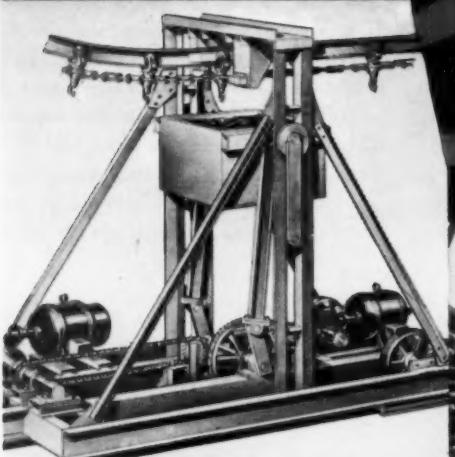


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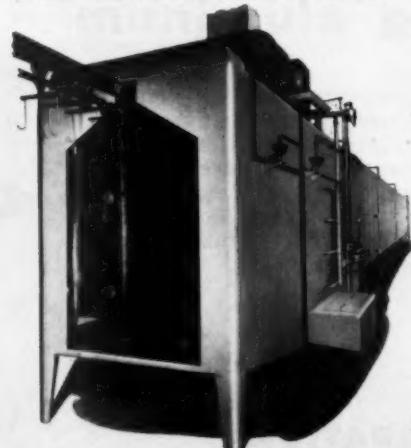
Mahon Automatic Dip-Coating Machine. Paint tank moves up and forward at conveyor speed to immerse parts. It then lowers away and moves back to its original position and repeats. Paint Level and Temperature is maintained by continuous circulation through Flexible Lines.



Mahon Conventional Type Hydro-Filter Spray Booths, with "Hydraire" Flood Sheet, Designed to meet the Specific Requirements of a Home Appliance Manufacturer.



Interior View of Typical Mahon Dip-Coating equipment. The Finish Baking Oven is located above this enclosure.



Typical Mahon Flow Coating Machine and Drip Tunnel. Automatic controls and equipment can be provided to maintain constant temperature of coating material.

Should YOUR PRODUCT be SPRAYED, DIPPED or FLOW COATED? or does it demand a COMBINATION of these COATING METHODS?

In some plants, where our advice on finishing methods has been sought, we have found parts being flow coated when substantial savings could have been effected in the over-all finishing costs through the employment of the dip method—savings in thinner, paint, initial cost of equipment and maintenance...and the dip method, in this particular operation would have provided a better finish with fewer rejections. It is therefore wise to get expert advice when confronted with a finishing problem, regardless of what the part or product may be. Many factors enter into the basic and all-important decision on method or combination of methods to be employed to produce the finest results at the lowest possible unit cost. Mahon engineers, with a background history covering thousands of complete finishing systems—including Dip, Flow Coating and Spray Equipment—are in a position to make sound, unbiased recommendations on the "HOW" to finish any product under any conditions or production requirements. Over thirty years of experience in planning, designing, building and installing finishing systems of every type for every conceivable product painted on a production basis, has equipped Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere . . . can you afford to rely on less when so much is at stake? See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-654.

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MAHON

Without changing the pickling procedure from that used for ground coat, we have successfully enameled millions of kitchen utensils without encountering any of the enameling problems sometimes resulting from improper pickling procedure.

Gray speckled titanium enamels will fire to maturity with ground coat and finish coat enamels. The firing conditions must be uniform, at all times, to obtain the same color, or shading, of the fired finish because we have found that the gray speckled titanium enamels are subject to the same sensitivities as titanium cover coat enamels.

Physical properties of the fired enamel are in excess of the commercial standard required for the enameled kitchenware industry. These

commercial standards were proposed through joint cooperation of the ceramic engineers of the industry and the Department of Ceramic Engineering, University of Illinois, with full approval by the Enamelled Utensil Manufacturers' Council, and finally adopted as Commercial Standard CS100-44 by the United States Bureau of Standards. The purpose of this commercial standard was to establish standard specifications and methods of test for porcelain enameled steel utensils for the guidance of manufacturers, distributors and users of this product. By its general acceptance and use, and by means of labels on the utensils certifying conformity with this standard, it is the aim to maintain the quality and appearance of porcelain enameled steel

utensils in accordance with approved standards.

This standard provides performance requirements for porcelain enameled steel utensils, both multiple-coated and single-coated, for cooking, household, food storage and hospital use. The requirements include quality of base metal, appearance, thickness, enameling; resistance to boiling acid, thermal shock and impact; capacity, methods of test and identification.

By using one-coat gray speckled titanium enamels as a base, we have developed many beautiful colors by the controlled addition of color oxides. Because of the cobalt blue element, it is our opinion these colors are limited to blues, greens and browns of various shades.

Electrostatic spraying of porcelain enamel

by M. L. Pouilly • THE ILLINOIS SPRAY & EQUIPMENT COMPANY

FOR the past eight years, various manufacturers of electrostatic spray equipment have endeavored to obtain in the porcelain enamel field the high degree of efficiency enjoyed in the electrostatic spraying of synthetic paints. Repeated attempts to spray porcelain enamel electrostatically had produced only indeterminate results.

In 1945, a paper was presented at the ACS meeting by James B. Willis, and published in the June, July and August issues of *finish*. The paper was quite thorough and gave much valuable information. Other important information appeared in articles by R. E. Helmuth (*finish*, January, 1945) and Claude Cleghon (*finish*, October, 1946). Unfortunately, there was not much headway made in industry.

It was about this time that a number of electrostatic units were installed, but for one reason or another they were all taken out with the exception of the installation at Clyde Porcelain Steel. This unit was used on their Veos tile line, and has since been moved to Porcelain Enamel Products, in Rehoboth, Massachusetts.

Since the time of Willis' paper, a great deal of work has been done by the manufacturers of high voltage equipment, spray equipment people, and the material suppliers.

In late 1950, the interest in electrostatic spraying of porcelain enamel was rejuvenated with promising results. Each successive test run gave new hope that the electrostatic spraying of porcelain enamel could be done successfully. This was principally due to three reasons.

The spray equipment manufacturers had introduced equipment which gave better atomization, along with more positive control of both fluid flow and atomization of air.

The frit manufacturers had introduced new materials and a determination to do everything possible to make the materials react as well as organic finishes.

A new approach was employed to the use of both the materials and equipment.

The spray equipment manufacturers had specially designed their equipment to perform for electrostatic spraying. The air cap has been so designed to give maximum atomi-

zation at extreme low air pressure. These air caps also had low forward velocity in order to hold the atomized particle in the electronic field as long as possible.

In order to further reduce the loss through overspray, the spray booth air velocity should be reduced to approximately 70 feet per minute.

The material itself has helped a great deal in this new program, especially the titanium enamel with its high opacity and its ability to be milled to extreme fineness.

The success of the ground coat application by the electrostatic process has been encouraging. The further developments of the ground coat frits and its formulation has no doubt made possible the electrostatic spraying of ground coats.

At every test conducted, either in ground coat or finish coat, it was found that the use of sodium nitrite improved both the atomization and the wrap around of the porcelain enamel slip. It is quite possible that the use of other electrolytes may give the same results, but they were not investigated.

Last, but not least, the electrostatic

equipment itself has been modernized. It has been simplified so that most plant engineers and their staff can install and service some types of this equipment.

The high voltage equipment is available in both half wave and full wave with the voltage ranging from 80,000 volts to 140,000 volts and millamps from 1 to 10 millamps.

It has been our experience that use of the higher voltages provides reserve of power set up by such equipment to overcome the heavier resist-

ance loads to be used, such as lay-down conveyor, and still function with desirable amperage.

With the introduction of the new electrostatic units a new approach was introduced. Prior to this, the method of spraying (as explained by Willis) was either parallel or 15 degrees to the work.

The new approach was the right angle method of spraying. The guns were placed at right angles to the normal and spraying was done through charged grids. This new

method added the advantages of mechanical spraying to the electrostatic features.

The frit manufacturers have been most helpful and contributed greatly to the success achieved to date.

The material formulations were left up to the frit manufacturer. Standard frits were used and fineness of various degrees were tried. The specific gravity and set were adjusted for the best results.

The materials used for the various tests have ranged from 2% on 200 mesh screen as to fine as approximately 1% on a 500 mesh screen. Estimated after a number of tests, it was agreed that for all purposes the 1/2% on a 325 mesh screen was the best fineness. The specific gravity decided upon during the test run was 1.60 grams, but while making a production run it was felt that higher specific gravity could be used. It appears that 1.65 grams would work satisfactorily.

The set, too, varies, depending on the plant and the ware to be sprayed. During our final test run it was believed that a pick-up of 20 grams on a ground coated cylinder 6" high and 12" in circumference was the best, but during our first production runs the pick-up of 37 grams worked very well.

The results of the first test were encouraging and improved with each successive test. At the most recent test, range parts such as door panels and range sides were sprayed in the finish coat with complete coating on the flanges, thus eliminating the necessity of flange sprayers.

The success of the electrostatic spraying of porcelain enamel has been greater on the overhead-type conveyor than on a lay-down pin-type conveyor.

Orange peel was lessened to a great degree. The texture of some of the tests run had a glass-like appearance.

The reflectance of the finished product was increased to such a degree that it is quite possible that a 40% reduction in film thickness can be achieved, plus the saving effected by reduced overspray in booth. It was at first difficult to believe that there could be as much as a 50%



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for over 2 years with

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reduction in overspray, but careful checks collaborated the facts.

To further verify the economies of this process, a number of square foot panels were sprayed with and without the high voltage potential. The panel using the high voltage had a deposition of 16.9 grams (dry weight), while the panel without the high voltage had only 7.9 grams (dry weight).

In another instance, a square cabinet was sprayed in finish coat. The cabinet was suspended from an overhead conveyor and sprayed on the front side using the high voltage. The dry weight on the front side was 16 grams, while the weight on the right and left side had a 3 gram coating, approximately 20% coating on each side (right and left) which totaled to 40% saving of overspray which would normally have gone into the spray booth or stack.

There is also a labor savings in the electrostatic method of spraying porcelain enamel. This varies in degree, dependent upon the type of ware to be porcelain enameled and the type and condition of spray conveyor.

Following are some requirements that are a must:

1. Production runs should be large enough so as to minimize the necessity of gun changes. There is an optimum gun setting for each product, but it is often possible to strike a compromise which, although reducing somewhat the efficiency of the process, will still be worthwhile.

2. The material control must be held to closer limits than conventional operation in the enamel plant, but it need not be extreme. The pick-up and set should be worked out by plant tests and then maintained.

3. Gratifying porcelain enamel efficiencies will reward the thorough training of operating crews. High level of control and maintenance will produce the best results.

4. Under the close scrutiny of recent tests, certain shortcomings of present equipment has been noted. The desired improvements should help the electrostatic system perform an even better job.

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PRESSURE FILTERS
DEMINERALIZERS
RUBBER LININGS
CORROSION TEST CABINETS
HEAT EXCHANGERS

Mass producing the "metal" television tube

(Continued from Page 37)

into a television receiving tube. It is characteristic of this corporation to design whatever machines are necessary to perform the job at hand. As a consequence, the process is replete with unique machines ingeniously designed to perform various intricate operations.

The first of these is the sealing machine, where the glass funnel and glass neck (previously joined together on another machine) are joined to the small end (butt) of the metal shell. The shells are placed butt end up on one of several revolving spindles which, in turn, is attached as an arm to a central wheel, the whole arrangement turning about a central axis. This design permits the turning spindles to be intermittently advanced around a circle to stations for prefire, fire, stretch, and annealing. This and the next operation, where the faceplates are sealed into the metal shell, are the crucial operations for it is here that the success of the seal is determined. The engineers, production men and supervisors maintain a close scrutiny to be sure the fires are properly set to develop the strongest possible seals. The fires must be hot enough to deliver the heat rapidly to bring the parts to be joined to the proper temperature before the heat is dissipated to other parts of the assembly. The intensity of heat needed requires that city gas be burned with oxygen. This produces a flame giving enough heat without too much blast.

After coming off the glass cone sealing machine, the part is transferred by conveyor to the faceplate sealing operation. While on the transfer conveyor between the two sealing machines, a faceplate is put into position in the shell. The faceplate sealing machine which has the same principle of functioning as the previous sealing machine (but is much larger) holds the shell assembly with the butt end down and applies the heat to the faceplate end. The load position is insulated from the other positions in the cycle and separated from them by automatic-

ally operated doors which are timed to open only when the machine is due to rotate to the next position. This reduces the heat loss and protects the loader from much of the heat. Heat protection for the operator is dealt with by means of a very powerful blower which provides cool air in large volume to each station. The loader performs no other function in the sealing of the faceplate after placing the assembly on the machine. The machine is automatically timed to advance the shell at proper intervals through the cycle. After sufficient heat has been applied to the rim of the shell to soften the glass and cause it to flow out along the sealing surface, it must be prevented from sagging under its own weight. This is done by introducing air through the neck of the envelope, accomplished by a combination of automatically and hand-controlled systems. An operator watches the shells as they advance through the critical stages and adjusts the air pressure within the shells to maintain the most desirable curvature and seal shape. The temperature of the assembly is then reduced slightly to the point where the faceplate will hold its shape when it is advanced to an annealing and cooling oven integral with the sealing machine. When the shell has passed through annealing, it is unloaded from the sealing machine and transferred to a monorail-type cooling and annealing tunnel which carries the assembly to the automatic washers. Here strong cleaning and acid solutions are passed through the inside of the tubes as a jet spray preparatory to fluorescent coating of the tubes.

Adding the "picture" screen

The fluorescent screen coating is a thin film of a material known as a "phosphor" applied to the inner side of the faceplate which, when struck by the stream of invisible electrons emitted from an electron gun, produces a visible light. This light is the image we see cast upon the viewing screen of the television set. The

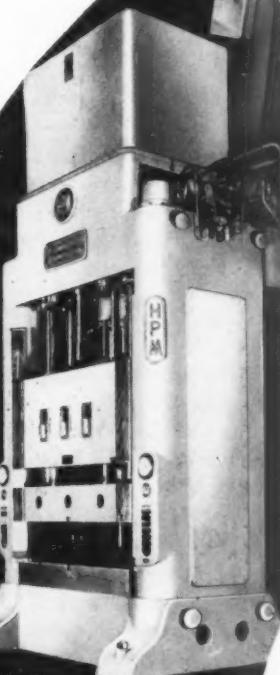
parts are delivered by conveyor to the coating department where they are loaded faceplate down upon a vibrationless moving belt and charged with a water mixture containing a binder and the phosphor. The phosphor settles from the mixture as the tube passes toward the opposite end of the belt where the supernatant liquid is automatically decanted. Decanting must be accomplished without vibration or the newly-formed "screen" will be ruined. Prior to removal from the belt, the tubes are blown dry. The parts are transferred to another conveyor and rigidly inspected for screen or glass-to-metal flaws, then passed along conveyors to a second coating operation, where the inside walls of the shell are covered with black matt material which is an electrical conductor.

The parts are then moved through a "bake out" lehr where several curative functions are accomplished. On emerging, the tubes are given another critical inspection and conveyed to the electron gun installation machines. The electron guns are assembled in an adjacent building specially constructed for this very exacting work, some of which is done under microscopes as the parts are too small to be seen plainly by the naked eye.

Assembly

The electron gun, being the heart of the tube, is sealed into the neck of the tube on a revolving multiple-head machine somewhat similar to, but much smaller than, the machines for sealing the faceplate and funnels. The assembled units are then put onto cars which travel on tracks and have sliding contacts for picking up electrical power at appropriate stations to energize the evacuating and heating devices needed in the final steps of sealing the tubes. As the car moves along the "straight line," which is in reality a tunnel heater, it is evacuated of air. Motors, switches, relays, and temperature control equipment perform the operations of automatically drawing a vacuum within the tube, heating the envelope to drive out the air and gases in the pores of the metal and

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GOVERNMENT CONTRACT
calls for STAMPINGS



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**3 Expansive, Well Equipped Plants
Are Fully Qualified to Serve You Well**

Regardless of your stamping requirements, New Monarch's 43 years of proved skill in the die and stamping field, together with their undeviating dependability for quality, accuracy and service, make them your logical source of supply.

For stampings of superior quality and the finishing of sheet metal parts and sub-assemblies, New Monarch's assistance will enable you to keep your production lines running smoothly and efficiently. Insofar as your need for stampings goes, let us assume the responsibility for your meeting your contract commitments promptly.

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NEW MONARCH MACHINE & STAMPING CO.
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glass, and then maintaining the vacuum until the operator has sealed the tube by melting the tip with a hand torch.

The tube is then lifted by mechanical fingers to a cabinet where a barium compound, held in a tubular container of molybdenum within the now vacuum tight tube, is heated from the outside to incandescence by means of radio frequency current. The barium compound is volatilized and condenses on the neck of the tube where it acts as a scavenger to those injurious gases liberated within the tube during its operation. In this way, the barium compound protects the cathode of the electron gun which might otherwise be poisoned, causing foreshortened life.

The operation of heating the scavenger is called "flashing the getter." The flashed tube is then transferred to a "rocking chair" conveyor, where the protruding metal wires which lead through a glass seal to the electron gun are threaded into the plastic and metal base. The base is then cemented to the neck of the tube. Heating coils of the resistance type are placed around the newly attached

base to cure the cement while the tube passes along conveyor. At the opposite end the electric coil is removed and the metal wires trimmed and soldered.

The tube is moved to another conveyor, where it is connected to an electrical current source which feeds energy to each of the circuits within the tube. This is done to "activate" the cathode portion of the electron gun, making it an efficient emitter of electrons. This conveyor also acts as an aging conveyor to insure the tubes functioning in a stable manner.

Testing is "all important" in tube production

When the tubes emerge from the tunnel of the aging conveyor, they are placed in a testing chamber. Every tube coming off the assembly line must pass the tests of these instruments before the tube is permitted to move to shipping. Some of the tests performed here include: testing for screen uniformity, electrical operating characteristics, presence of gases, emission control, light output, and focus.

When the tube passes all of the

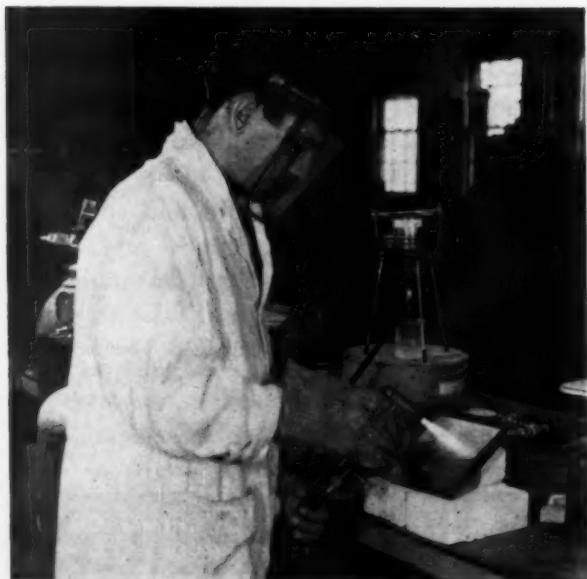
rigid tests, it is removed to a conveyor which delivers it to the shipping room. While on this conveyor it receives an external coat of a black matt paint on the exposed metal surfaces, is dried under infra-red lamps, cleaned, and labeled for identification and caution in handling. Tubes are then boxed, labeled, and delivered to the warehouse. From here they are shipped to the various set manufacturers throughout the country.

The product and the operations of this plant provide an exciting lesson of the limitless possibilities that exist in the field of specialized porcelain enameling and glass-to-metal and glass-to-glass sealing techniques. All the ingredients of success are so well exemplified: vision, research, development, cooperative effort, engineering skill with persistence, and the cross-pooling of information from divergent fields. By virtue of these efforts the television industry has acquired a new process yielding a better product at less expense, and the industry has made additional progress in a new field—that of producing an extremely strong adhesive for high temperatures.

**RESEARCH AT OAK RIDGE LAB.
INCLUDES FLAME-SPRAY**

Perhaps the most extensive laboratory of its type in the atomic energy

program is the new ceramics department of the Oak Ridge National Laboratory, which Union Carbide and Carbon Corp. operates for the Atomic Energy Commission.



The application of ceramic coatings by spraying the finely powdered ceramic through a flame onto the prepared surface of the material to be coated is among the fabrication techniques under investigation by the ceramic group. G. D. White applies a ceramic coating to steel by this flame-spray method.

The ceramics department, headed by Dr. J. M. Warde, is part of the Oak Ridge National Laboratory Metallurgy Division under Dr. J. H. Frye, Jr.

One of the outstanding problems in the development of nuclear power is to find suitable material for the construction of nuclear reactors or atomic furnaces, particularly since many of the service requirements are highly unusual.

"Ceramets"—combinations of ceramic materials and metals with the best qualities of both—are possible "white hopes" of reactor materials research (see article on "cermets" scheduled for December finish).

But cermet studies are only a part of the Oak Ridge ceramic research program. Other important features include techniques for the application of ceramic coatings to materials used in reactors; and evaluation of the effect of radiation damage on ceramic materials.



Aaron Goldman (2nd from left), Association president, assists in ribbon-cutting ceremony opening the exhibit.

ADS OUT

Automatic merchandising association holds convention and exhibit

AN ESTIMATED 5,000 persons identified with vending machine manufacture, operation or product supply, attended the National Automatic Merchandising Association trade show and convention, held in Chicago, August 23-26.

Among the 129 exhibits that filled the entire one-floor trade show facilities in the hotel were coin-operated machines that dispense ice cream cones, chocolate sundaes and hot sandwiches; a coin-operated cushion for spectator sports events; and scores of units that dispense soft drinks, fruit juices, coffee, hot beverages, candy, gum, cigarettes, milk, pastry, ice cream, etc.

At the opening session, Aaron Goldman, Association president, said, "Millions of workers have come to rely on these 'silent salesmen' for between-meal refreshment." This statement was made in citing the rapid growth in automatic merchandising in recent years, particularly in industrial plants.

Earl D. Triplett, manager of food

services, Ford Motor Co., pointed out that automatic merchandising is of vital significance to industry. In his address, "What Automatic Merchandising Means to Industrial Management," he said, "It helps to improve morale; increase efficiency; improve quality; reduce absenteeism; improve employer-employee re-

lations; reduce cost of food services; and provide better quality of food at minimum prices."

This relatively small industry has grown rapidly in recent years. It is estimated that 2,747,650 coin-operated machines are now in use. Estimated annual sales through them is \$1,405,250,000.

One of the 129 exhibits at show held at Conrad Hilton Hotel.





Room Air-Conditioners Get **LASTING ENAMEL ADHERENCE**

... and adherence of baked synthetic enamel finishes is extremely important to Fedders-Quigan Corporation, Buffalo, New York, manufacturers of Room Air Conditioners.

Parts of these units are often subjected to a constant flow of moist and humid air. Approximately 50 percent of the shell is exposed to the atmosphere. Because of high vulnerability to rust and corrosion, it is essential that the exposed surfaces not only "take" but also tenaciously hold the attractive finishes that are applied.

For these reasons, Republic Electro Paintlok is used for the shell, mounting brackets, fan shrouds,

bulkheads and covers of the Fedders Room Air Conditioners.

Republic Electro Paintlok facilitates manufacturing operations, too. The tight zinc coating will not crack, peel or flake during normal fabrication. Special chemical treatment gives the zinc coating an inert, non-metallic surface which is absorbent in character; a prime condition for painting.

Get the full story of product improvement with Electro Paintlok. Write for the colorfully detailed Republic Booklet 525. Address:

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ELECTRO ZINC PLATED SHEETS
Electro Paintlok • Electro Zincbond



Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

NEWS

WESTINGHOUSE TO RE-ENTER ROOM COOLER BUSINESS

Westinghouse Electric Corp. will re-enter the field of room air conditioning with a completely new line of units in 1954, it was announced by H. F. Hildreth, manager of refrigeration specialties for the company's electric appliance division.

The move is being made to round out the Westinghouse line of major appliances, stated Hildreth. The firm has been out of the room cooler business since 1942.

DAVIDSON TO CALCINATOR

Don Davidson has joined Calcinator Corp., Bay City, Mich., manufacturer of incinerator equipment, as sales manager, it was announced by John W. Hebert, president. Since April, 1950, Davidson was sales promotion manager of the dryer and ironer divisions of Whirlpool Corp.

SCHWELLER DIES, FRIGIDAIRE UPS GIBSON AND VAN SCYK

S. M. Schweller, 68, chief engineer for Frigidaire Division of General Motors, died August 14. With the Frigidaire organization since 1921, Schweller was responsible for guiding the development of many improvements made in the company's products. He had been chief engineer since 1937.

J. L. Gibson was promoted to chief engineer, and Howard E. Van Scyk was named assistant chief engineer,

in charge of household and commercial refrigeration and air conditioning.

REVCO NAMES WILLEY TO WORKS MANAGER POST

R. Wade Willey has been named works manager of Revco Inc., home



freezer manufacturer in Deerfield, Michigan, it was announced by Gregg F. Forsthoefer, president. Willey had held a similar position with Clyde Porcelain Steel Division of Whirlpool Corp., Clyde, Ohio.

He formerly held key positions with Nash-Kelvinator Corp., Grand Rapids, Mich., and did research work

MURRAY ACQUIRES ELJER, NAMES MENGE EXEC. V. P.

C. H. Menge, vice president of The Murray Corporation of America, has been elected executive vice president of The Eljer Company, which was

recently acquired by Murray, according to an announcement by Byron C. Gould, president of Murray and its subsidiary. It was stated that Menge,

MULLINS MFG. UPS BOONE

Mullins Manufacturing Corp. has announced the appointment of A. F. Boone as assistant sales manager of the contract sales division.

HOUGH NAMED GEN. MGR. OF PERMAGLAS-HEATING DIV.

George P. Hough has been appointed general manager of the Permaglas-Heating Division, Kankakee, Ill., it was announced by F. S. Cornell, vice president and general manager of A. O. Smith Corp.

Hough fills the post vacated several months ago when Cornell was moved into the top management staff at Milwaukee. In the interim, Hough has served as chairman of an operating committee which administered the water heater manufacturing plant. He will continue his duties as an assistant to the president in the north central region, the office of which is in Chicago.

GAMA BOARD TO MEET DURING AGA CONVENTION

New and retiring officers of the Gas Appliance Manufacturers Association will hold a board of directors meeting in St. Louis, October 25, in conjunction with the annual convention of the American Gas Association, it was announced by James F. Donnelly, retiring GAMA president.

New officers will assume their duties at the conclusion of the convention on October 28. They are Sheldon Coleman, president; T. T. Arden, first vice president; W. F. Rockwell, Jr., second vice president; and Lyle C. Harvey, treasurer.

who had been in charge of sales for Murray's home appliance division, will devote his full time to the Eljer firm, and will direct responsibility for all Eljer operations and sales.

T. W. Hardy, vice president of the home appliance division, will assume direct responsibility for home appliance sales activities in addition to his present duties.

These moves, Gould explained, mark another step in the close inte-

gration of the Murray and Eljer organization, begun immediately after Murray acquired Eljer nearly two months ago to form one of the country's major plumbing fixture firms. Eljer had plants at Ford City, Pa., Salem and Marysville, Ohio, while Murray has plants in Detroit and Ecorse, Mich., and Scranton, Pa.

First of two important steps already taken was the formation of a combined plumbing ware sales organi-



C. H. MENGE

zation. Second was the integration of product design. The next step will be the coordination of shipping, stated Gould.

CHAMBERS TO PRODUCE MORE GAS RANGES IN COLOR

A. H. Scheffer, of Chambers Corp., Shelbyville, Ind., recently predicted that more than half of their production of console model gas ranges will soon be in color, instead of white.

EMERSON RADIO TO ENTER AIR CONDITIONING FIELD

Benjamin Abrams, president of Emerson Radio & Phonograph Corp., New York City, has announced that his firm will soon enter the field of room air conditioning units, which will be available to the public well in advance of the summer of 1954.

CONTRACT MANAGER FOR SERVEL

G. Howard Christine, formerly a contract sales representative, has been named manager of the contract sales division of Servel, Inc., Evansville, Ind., it was announced by James F. Donnelly, vice president of sales.

NEW AVONDALE PLANT TO MAKE ARCHITECTURAL PORCELAIN

Avondale Marine Ways, Inc., Avondale, Louisiana, has under construction a large capacity plant and facilities for the manufacture of porcelain enamel architectural products.

This new division of Avondale will

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VALVES
For The GAS
HEATING INDUSTRY



Main shutoff valve,
No. 2000
Sizes: $\frac{1}{2}''$, $\frac{3}{4}''$, 1",
 $1\frac{1}{4}''$, $1\frac{1}{2}''$.

For...Furnaces...Conversion Burners...All Heating Equipment



Pilot valve, No. 1920
 $\frac{1}{8}''$ x $\frac{1}{4}''$ c.c.



Pilot valve, No. 1910
 $\frac{1}{8}''$ x $\frac{1}{4}''$ c.c.

These are only two of the complete line of pilot valves currently being supplied to the industry.

Gas Appliance Fittings produced by Detroit Brass & Malleable Co. include a complete line of valves for ranges, water heaters, space heaters, furnaces and all other types of gas equipment.

GAS VALVE DIVISION

DETROIT BRASS & MALLEABLE CO.
DETROIT 9, MICHIGAN

be ready for operation early in 1954. It will be under the management of Ben F. Birdwell, with technical and production operations under the direction of Paul Kates.

ANNOUNCE CONFERENCE ON "PORCELAIN ENAMEL IN THE BUILDING INDUSTRY"

A conference on "Porcelain Enamel in the Building Industry" will be held at The National Academy of Sciences, Washington, D.C., November 12 and 13.

Jointly sponsored by the Building Research Advisory Board and the Porcelain Enamel Institute, the two-day session will include treatment of these four broad subjects:

"Fundamental Properties of Porcelain Enamel as a Structural Material"; "Uses of Porcelain Enamel in Building Design"; "Porcelain Enamel as an Engineering Material"; and a panel discussion of "Present Problems and Potential Uses of Porcelain Enamel in Building Construction."

EMERSON ELECTRIC ENTERS AIR CONDITIONING FIELD

The Emerson Electric Mfg. Co., St. Louis, has announced a line of room air conditioners for 1954. The firm's new products will be exhibited at the Refrigeration and Air Conditioning Exposition, in Cleveland, November 9-12.

VIKING AIR CONDITIONING NAMES RAFFERTY, DUTHIE

Marion I. Levy, president of Viking Air Conditioning Corp., Cleveland, has announced the appointment of Robert B. Duthie as general manager of Modern Process Plating Co., a Viking subsidiary.

A recent report also announced the appointment of James S. Rafferty as plant manager of Viking.

CASCINO HEADS RESEARCH FOR BENDIX AND CROSLEY

The appointment of A. E. Cascino as director of market research for the Crosley and Bendix Home Appliance Divisions of Avco Mfg. Corp. was announced by Parker H. Erickson,

finish OCTOBER • 1953

Avco vice president and director of sales for the recently combined Crosley and Bendix operations. He had been director of market research for Bendix since 1946.

MULLINS NAMES SMITH GENERAL MGR. OF OPERATIONS

Mullins Manufacturing Corp. has announced the appointment of Harold O. Smith as general manager of operations for the firm's plants in Salem and Warren, Ohio. He was

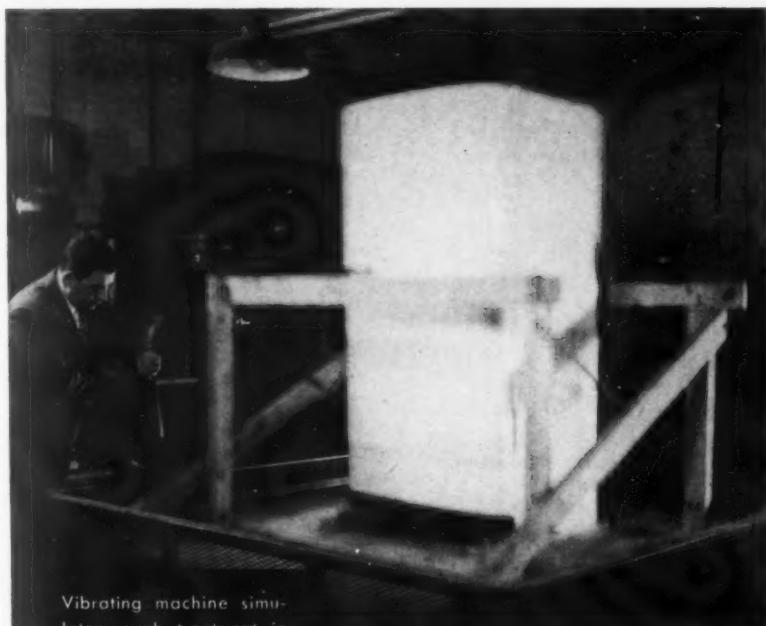
works manager at the Salem plant, where he will remain as acting works manager.

At the same time it was announced that A. P. Schmauch was appointed chief industrial engineer for Mullins.

ROY JAEGER DIES

Roy H. Jaeger, 55, died August 18 in Hannibal, Missouri. Well known throughout the enameling industry, he recently was engaged in insurance work.

OUR PLANTS are part of your production line...



Vibrating machine simulates rough treatment in shipping and handling... demonstrates non-settling properties of Fiberglas Insulations.

FIBERGLAS* TESTS like this can help you double-check how insulation performs in your appliances.



..and this quality feature is part of your selling line!



TUNE IN "ARTHUR GODFREY DIGEST", sponsored by Owens-Corning Fiberglas Corp., broadcast every Sunday afternoon by the entire CBS Radio Network of over 200 stations.

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.

BENJAMIN ELEC. NAMES P. A.

Benjamin Electric Mfg. Co., Des Plaines, Ill., has announced the appointment of Ralph C. Nelson as purchasing agent.

WHITE APPOINTED MFG. ASST. TO CORY PRESIDENT

John N. White has been appointed manufacturing assistant to the presi-

dent of Cory Corporation, according to J. W. Alsdorf, president. In his new capacity, White will serve as a

liaison between the Cory, Nicro, Fresh'n'd-Aire and Flavor-Seal manufacturing plants.

STEEL KITCHEN CABINET MFRS. DISCUSS MARKETING

At the September 2 quarterly meeting of the Steel Kitchen Cabinet Manufacturers Association, in Cleveland, special attention was given to the ways in which individual As-

sociation members could analyze the various market potentialities throughout the country.

Guest speaker was Donald M. Hobart, vice president and director of research, Curtis Publishing Co., who discussed the Curtis market index.

The Sales Promotion & Advertising Committee discussed ways in which members could circulate the newly-prepared brochure distributed by the Association to homeowners, architects, contractors, and other interested parties.

The Trade Statistics Committee discussed plans for an employee benefit survey to be conducted among members very shortly.

The board of directors elected Arthur J. Tuscany, Jr., to the position of executive secretary-treasurer.

PAINT SUPERINTENDENT WITH A "55-GAL. TOUCH"



Here is Ferbert-Schorndorfer's General Superintendent, Caton R. Weaver, checking out a shipment of paint for an appliance manufacturer.

"Cate" (as he is known by F-S customers) is a 30-year specialist in mixing multi-drum batches of custom finishes...with test-tube accuracy.

Experience has given him that "55-gal. touch"; energy and enthusiasm keep him going in high

gear; human understanding has built his efficient production team. As a result, uniform quality is effectively controlled throughout the production of F-S finishes.

Combine men like "Cate" with Ferbert-Schorndorfer's customer service policies...and you have the reason why so many well-known manufacturers insist upon F-S enamels and lacquers.

For fine, uniform finishes, write directly to:

THE FERBERT-SCHORNDORFER COMPANY

A DIVISION OF AMERICAN-MARIETTA COMPANY

12815 Elmwood Ave.



Cleveland 11, Ohio

BIG DEVILBISS GOVT. ORDER

A government contract totalling more than a million dollars was recently received by The DeVilbiss Company, it was announced by Howard P. DeVilbiss, president. The award, issued by the Detroit Ordnance Tank and Automotive Center, covers 140 large paint spray exhaust booths of the water-wash type.

WATER CONDITIONING GROUP NAMES EXECUTIVE CHAIRMAN

C. L. Scribner, assistant general manager of Elgin Softener Corp., Elgin, Ill., was elected chairman of the executive board of the Water Conditioning Foundation at a recent meeting in Chicago.

Attending the meeting were the following board members: T. W. Bruner, president of Bruner Corp., Milwaukee; H. F. Werhane, president of Culligan, Inc., Northbrook, Ill.; A. K. Rheem, Jr., manager of tank division of Rheem Man-

OCTOBER • 1953 finish

ufacturing Co., Chicago; C. A. Spaulding, Jr., vice president and general manager of Refinite Corp., Omaha; J. P. Lawlor, president of General Filter Co., Ames, Iowa; L. G. Lindsay, president of The Lindsay Company, St. Paul; and John C. Hosford, executive secretary and treasurer of the Foundation.

FLORENCE STOVE NAMES WRIGHT OPERATIONS V. P.

John P. Wright has been appointed vice president in charge of all manufacturing operations for Florence Stove Company's three plants at Gardner, Mass., Kankakee, Ill., and Lewis-



burg, Tenn. R. H. Taylor, Florence president, said that Wright was also named to the board of directors and will serve on the firm's executive committee.

Wright formerly was vice president of the durable goods division of Liquid Carbonic Corp., Chicago. He is a former vice president and general manager of A. B. Dick Co., Chicago, and previously was factory manager for Whirlpool Corp., St. Joseph, Mich.

TINNERMAN ELECTS OFFICERS

A. H. Tinnerman, president of Tinnerman Products, Inc., Cleveland, since 1939, has been elevated to the position of chairman of the board, and George J. Schad, vice president, has been named president.

finish OCTOBER • 1953

BRANNON HEADS PESCO MFG.

Pesco Products Division of Borg-Warner has announced the appoint-

ment of Paul W. Brannon as vice president of manufacturing. He was recently manager of manufacturing.

PRESSED METAL INSTITUTE ANNUAL MEETING, OCT. 7-10

The Pressed Metal Institute's annual meeting will be held at the Bellevue-Strafford Hotel, Philadelphia, October 7-10.

The opening day will be devoted to PMI Committee meetings, with the

big general business session and election of board of directors on the second day. Featured on the third day will be employee relations with the final day given over to an open meeting of the board of directors.

It happens every day...

"TOUGH GRIND"
FOR A
DENTAL CHAIR

In the average dental chair 3000 patients a year rely on their dentists for maintenance of sound, healthy teeth.

It's a tough grind for every part of the chair... including the finish. For the finish must maintain its appearance of beauty and surgical cleanliness throughout the long, hard-service life of the chair.

This new Motor Chair, conceived and built by S. S. White Dental Manufacturing Co., and styled by Henry Dreyfuss, is a study in functional perfection. It's gleaming, durable finish, for instance, was especially formulated in the Arco Research Laboratory to withstand the test of time and traffic.

Experienced Arco formulators tailor quality paints to exacting specifications... and pre-prove performance by Arco Cycle Testing which evaluates finishes to a degree unequalled in the industry. Write for full details.



TESTED FIRST TO LAST!

THE ARCO COMPANY, 7301 BESSEMER AVENUE • CLEVELAND 27, OHIO
A SUBSIDIARY OF AMERICAN-MARIETTA COMPANY
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TRY THIS ONE FOR SIZE! A Typical U. S. Electrical Tool Value

If you use $\frac{1}{4}$ -inch drills compare this U. S. Product, feature by feature, and then compare the price.

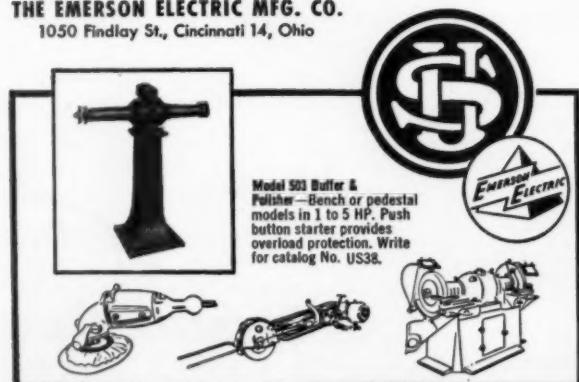
- 100% Full Ball-Bearing Construction ● Rugged Aluminum Alloy Frame ● Alloy Steel Gears
- Jacobs 3-jaw Geared Chuck ● Price...\$28.00*

Here is the ideal drill for continuous duty on even the most difficult jobs in automotive, maintenance and assembly work. Extremely powerful, it will not stall in heavy-duty drilling in metal or wood. Cool operating under constant use.

If you are not acquainted with a nearby U. S. Electrical Tool Distributor, or the complete line of U. S. drills, sanders, polishers, grinders and buffers, write us at once for Distributor's name and free catalog No. US38.

*Prices subject to change without notice.

*United States Electrical Tool Division
THE EMERSON ELECTRIC MFG. CO.
1050 Findlay St., Cincinnati 14, Ohio*



A Motor for your Combination ROTISSERIE and BROILER



- If you manufacture a Rotisserie, Broiler or a Household Range, a motorized Spit provides the new and modern way to cook — here is the motor for you.

Hundreds of thousands are in use today on this type cooking appliance and other products such as vending, coin operated, amusement and advertising displays where motion at slow speeds is desired.

Made in three basic sizes and with output shaft speeds of from 1 to 500 rpm and with torque of from 5 to 500 in. ounces. Write for descriptive information and data sheet.

MOTORESEARCH COMPANY

1600 JUNCTION AVENUE
RACINE, WISCONSIN

Designers and Manufacturers of
SPECIAL INDUCTION MOTORS



Make Your Own ENAMELING DROP HOOKS



Buy WIRE by COIL

HEAT RESISTING ALLOY WIRE

in 35Ni-15Cr

BY COIL OR STRAIGHT LENGTHS

All Size Bars for Drop Hooks and Fixtures
FROM WAREHOUSE STOCK

There's no finer heat resisting alloy than 35Ni - 15Cr for strength and freedom from scale in enameling operations.

Rolled Alloys, Inc. 
Heat and Corrosion Resistant Alloy Specialists

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AMERICAN HERITAGE GROUP

REELECTS MCCAFFREY

John L. McCaffrey, chairman of the board, International Harvester Co., has been reelected a vice chairman of the American Heritage Foundation, it was announced by Henry Ford II, chairman of the Foundation's board of trustees.

The Foundation has accepted as a major project for 1953-54 the sponsorship of Crusade for Freedom, a domestic public information agency and principal fund raiser for the National Committee for a Free Europe.

GRiffin LEAVES SERVEL, JOINS ING-RICH

Ingram-Richardson, Inc., Frankfort, Ind., has announced that John



E. Griffin has joined the firm as a ceramic engineer on the laboratory staff.

Following his graduation from the University of Illinois in 1949 with a B.S. degree in ceramic engineering, Griffin was employed by Seeger Refrigerator Co., Evansville, Indiana. Early in 1952 he joined Servel, Inc., as ceramic engineer in the ceramic laboratory.

SHERWIN-WILLIAMS BUILDING PLANTS IN LATIN AMERICA

Construction of new Sherwin-Williams plants in Valencia, Venezuela, and in Mexico City has been announced by Arthur W. Steudel, president of the paint manufacturing firm.

In addition to plants in Mexico and Cuba, the company has manufacturing facilities in Brazil and Argentina. "The new plants, like the older ones, will manufacture most paint products in the Sherwin-Williams Line," Steudel pointed out.

CAVALIER AIR CONDITIONING COMPANY CHANGES NAME

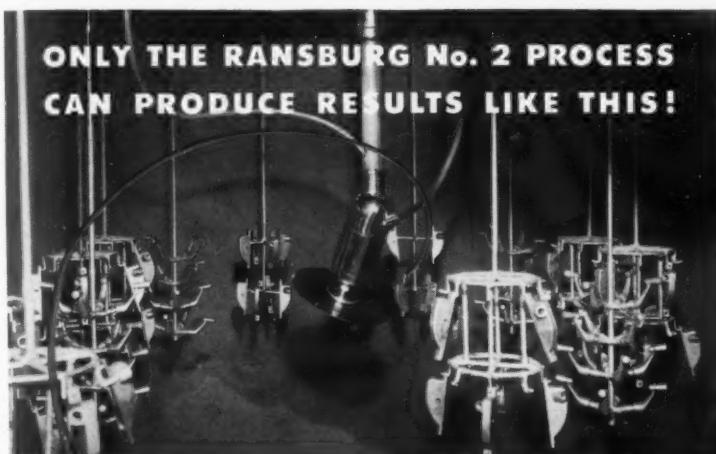
Cavalier Air Conditioning Company, Houston, has announced that the firm's name has been changed to The Forston Company in order that

their "products may not be confused with other goods merchandised under the name Cavalier." It was stated that the trade name "Cavalier" will be changed to "Forston."

U. S. RADIATOR PURCHASES

DRAYER-HANSON STOCK

"More than 99.01 per cent of the outstanding stock of Drayer-Hanson, Inc., of Los Angeles, has been deposited for transfer into United States Radiator Corp. common stock," according to W. C. McCord, of De-



This is the Ransburg No. 2 Process installation in the Standard-Thompson plant, Dayton, Ohio, where electrostatic spray painting eliminated a bottleneck in production of window hardware. The new Ransburg No. 2 Process disc-type atomizer is used.

● When Standard-Thompson Corporation revamped their window hardware finishing and assembly plant, they replaced hand spray painting with the RANSBURG NO. 2 PROCESS. And, look what happened!

PRODUCTION DOUBLED—from 500 to 1000 pieces per hour!

PAINT MILEAGE JUMPED 500%—Now they're getting 1500 pieces per gallon of paint where they formerly got 300!

QUALITY IS IMPROVED—They're getting a more uniform coating with NO rejects.

AND, IN ADDITION—They cut paint consumption four-fifths . . . there's a savings in labor and floor space, and maintenance is reduced to a minimum!

Whatever your product might be, if it's painted, and if your volume justifies conveyorized painting, substantial savings may be yours with one of the RANSBURG processes. Write for case history data in your own field.



Ransburg ELECTRO-COATING CORP.

INDIANAPOLIS 7, INDIANA

Electrostatic Painting Processes

troit, president of the parent firm.

"An aggressive program is now in progress for increasing sales volume of Drayer-Hanson air conditioning equipment, both through U.S. company-owned branches and an expanded organization of Drayer-Hanson sales representatives," stated McCord.

Enameled aluminum

→ from Page 59

tive murals in vibrant colors and designs are now a reality. This light

weight material should find ready use in marine construction — staterooms, cocktail lounges, dining rooms, lavatories, etc. The industrial field can also use this in new light weight refrigerators, furniture, washing machines, elevator doors and cabs, planes, trains, and store fronts, says its exponents.

Enameled aluminum is fired just under 1000° F., for approximately six minutes. The metal must go through a special pickling operation, the enamels applied and dried thoroughly (as in all other forms of metal enameling) before the work

enters the furnace or oven. The complete process can be handled in eight steps.

Enthusiastic supporters of the new medium say that the enameling plant should be versatile to such an extent that it has departments for enameling both steel and aluminum, whichever metal its customer specifies.

The metals — steel, copper, silver, builders metal and aluminum — have their own peculiarities and processing difficulties. To be proficient in handling all of them takes years of study and experience. The best way, says Winter, is to "learn by doing."

PENNSALT ENTERS PAINT BOND FIELD WITH "FOSBOND" LINE

Pennsylvania Salt Manufacturing Co. has entered into the field of chemical specialties for phosphatizing metals for corrosion resistance and paint bonding with a complete line of products for this field under the trade name "Fosbond," it was announced by William P. Drake, vice president.

For the past several years, Pennsalt has been manufacturing and marketing phosphate coatings, metal cleaners and lubricants for the cold working of steel. The new Fosbond line rounds out the firm's activities in the entire field of phosphate coatings, and virtually completes Pennsalt's

line of metal processing chemicals, it was stated.

Pennsalt has arranged cleaners, activators and phosphating compounds in a complete sales package, including phosphating compounds in a complete sales package, including phosphating compounds for application of various types of iron phosphate, zinc phosphate, or manganese phosphate coatings. In addition, the company has organized a field technical service staff and established a new technical service laboratory at its Whitemarsh research laboratories to provide engineering and technical service to customers.

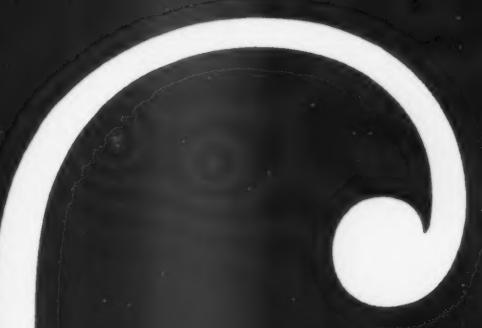
Meanwhile, Pennsalt's metal processing department has, according to J. J. Duffy, manager, expanded and trained its sales organization to serve all major segments of the metal working industry using cleaners and phosphate coatings. The sales program was launched officially at a meeting of this organization at Bedford Springs, Pa., during the week ending September 19.



Above: One of testing units in laboratory which has been set up by Pennsalt at its Whitemarsh research and development laboratories to provide technical service for customers using the new line of products for the application of phosphate coatings to metals.



Left: The front panel of a steel television cabinet is spray painted after an application of Fosbond coating.



safe transit



Ship Your Sales Story Along With Your Product In Eye-Catching Gaylord Boxes

There are no extra freight charges for shipping a solid sales message on every attractively printed Gaylord box. You profit because your shipping dollars do double duty by promoting your product all along your channels of distribution. With these Gaylord "traveling billboards" you'll regularly reach hundreds of important buyers, sellers and handlers

who see your product before it's unpacked. Sizes, shapes and designs that work to promote your product, as well as to protect it, are an important Gaylord "extra" service . . . and with Gaylord's quality of materials and workmanship, you can be sure every box is as brawny as it is beautiful. For information and cooperation, phone your nearby Gaylord office.

GAYLORD CONTAINER CORPORATION

SALES OFFICES



General Offices: SAINT LOUIS, MO.

COAST TO COAST

CORRUGATED AND SOLID FIBRE BOXES • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS • FOLDING CARTONS

ST-2

OCTOBER • 1953 finish

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and metal products manufacturing field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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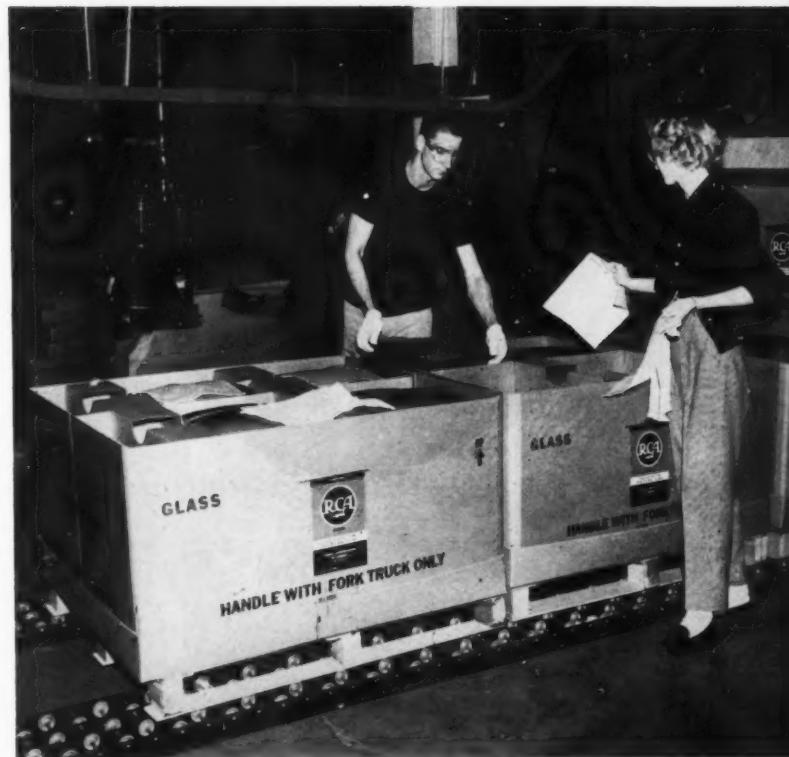
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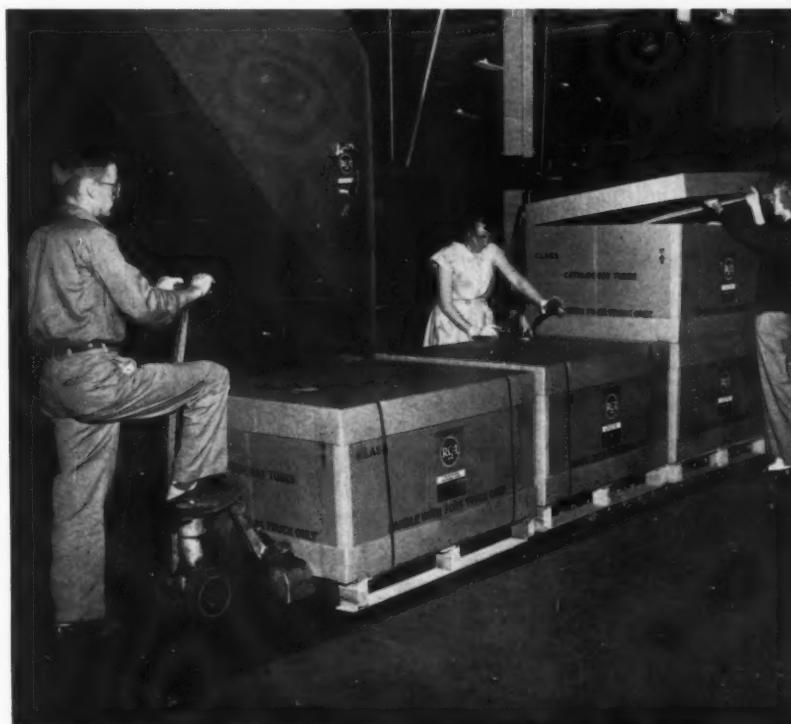
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Packaging television tubes—at the RCA plant in Marion, Indiana. Photo above shows multiple-tube pack in pallets on service conveyor which leads from clean-up station. Creped cellulose is used for face-plate protection. This size pallet holds eight tubes. Photo below shows strapping single pallet for shipment. Tube pallets are sometimes strapped two-high (see production story, Page 33).



Acme Steel Strapping Insures S.A. (*Safe Arrival*)

and eliminates Crating Department bottleneck for Hotpoint!



"BEFORE" HOTPOINT RANGE PRODUCTION LINE STALLED. Hotpoint workers found the hand stretcher method (shown above) too awkward in fastening corrugated board for shipping protection to new ranges as they poured off the production line. The line kept backing up.



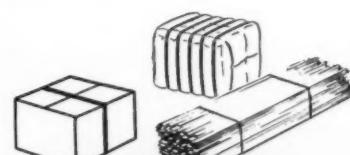
"NOW" ACME STEEL PNEUMATIC STRETCHER ELIMINATES BOTTLENECK, CUTS COSTS! The same workers now tension pre-cut Acme Steel strapping with an Acme Steel pneumatic stretcher. Shipping preparation costs have been held as much as 20 per cent below normal industry shipping costs. One operator says, "A man couldn't last all day before—too hard on the arms. Now with the Acme Steel system it's easy to keep ahead of production."

There it is. A clear cut case of how Acme Steel and know-how in steel strapping has helped a leading manufacturer solve a critical problem.

Chances are that many of your own production assembly or packing and loading problems can be cleared up with Acme Steel strapping, the best way to protect your product in shipment.

You will also learn that Acme Steel strapping, and the Acme Steel tools that work with it, will save materials and pay for themselves in a short time. Employees are happier because they know increased production means more, steadier jobs.

There are dozens of cases in the files to prove that nearly everything made to eat, wear, sit on or live in can be assembled and packed swiftly and will arrive safely with Acme Steel strapping. For specific examples, write to Acme Steel Products Division, Dept. F-103.



**ACME
STEEL**

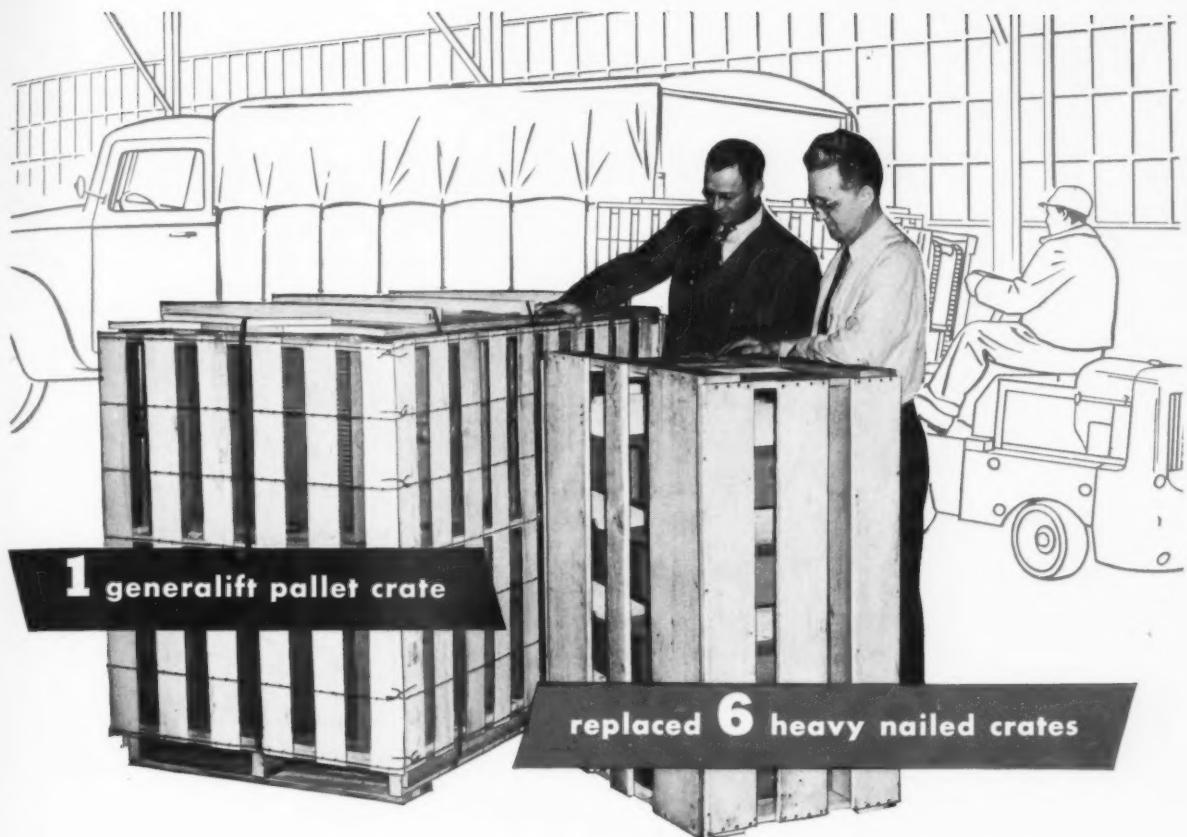
ACME STEEL CO.
CHICAGO

ACME STEEL COMPANY

2807 ARCHER AVENUE, CHICAGO 8, ILL.

ST-4

OCTOBER • 1953 finish



cut packaging costs 50%
reduced shipping costs 25%



Find out how other manufacturers are cutting packaging costs. Write for your free copy of "The General Box."

McCord Corporation, Plymouth, Indiana, solved both a packaging and a materials handling problem with the Generallift Pallet Crate shown above. Conferences with General Packaging and Sales Engineers produced a crate which held 24 radiators, packed easily, and could be handled by fork-lift from the shipping room all the way to assembly lines. It formerly took 24 heavy nailed crates and from 24 to 30 hours of labor to ready 96 radiators for shipment. Packing the same number in Generallift Pallet Crates takes only 4 hours.

This is only one example of the many packaging problems solved every day—at a saving—in General Box Company's two fine Industrial Packaging Laboratories. General Box packaging experts stand ready to help you cut packaging costs, too. Write for complete details.

General Box COMPANY

1823 Miner Street
Des Plaines, Ill.

Factories: Cincinnati; Denville, N.J.; Detroit, East St.
Louis, Kansas City, Louisville, Milwaukee; Pres-
cott, Ark.; Sheboygan; Winchendon, Mass.; General
Box Company of Mississippi, Meridian, Miss.; Con-
tinental Box Company, Inc., Houston

ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED

Generallift Pallet Boxes
Wirebound Crates and Boxes

Cleated Corrugated and Watkins-Type Boxes
Corrugated Fiber Boxes

All-Bound Boxes
Stitched Panel Crates



This view of the attic ventilating fan assembly line at Hunter Fan and Ventilating Co., Memphis, Tennessee, shows units being assembled with the shells still bolted to the tops and bases of the container that brought them from Indiana, and will carry them to their final destinations.

Re-using wrap-around shipping containers

no inventory of shipping containers required at Hunter Fan and Ventilating plant

AN economy step in the packing of attic fans for shipment so that it need carry no inventory of shipping containers is being used by Hunter Fan and Ventilating Co., Memphis, Tenn., with pronounced success.

Simultaneously, the Hunter firm has completely integrated, from start to finish, final assembly of Hunter and Robbins & Myers brands of package attic fans, with final packing-for-shipment.

This speedy and economical step is achieved by having the shells of the fans packed in Indiana, where they

are made, in wirebound boxes engineered for packing and shipping the completed units. A fan shell is bolted to both the top and bottom of container and is "wrapped up" in a one-piece "mat" that comprises the four sides of the container and is closed with wire-loop fasteners.

At the Hunter factory in Memphis, the wire loops are unfastened and the "mat" removed. The fan shell, still bolted to the container top and bottom, then goes through the final assembly line. When it emerges from the line, completely assembled, it is "wrapped up" again in a "mat" that

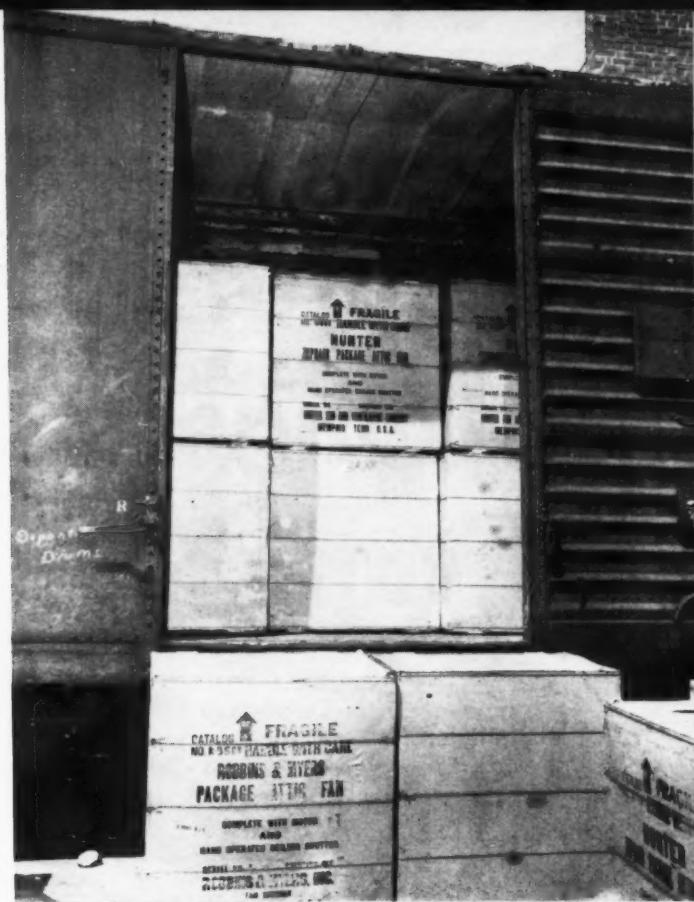
brought a shell from Indiana, perhaps even the same one in which its shell was shipped. Fan units are taken directly to the shipping room.

F. S. Brady, vice-president and general manager of the Hunter firm, said that this highly efficient and economical re-use of containers for package attic fans has been in effect for many years.

"Like all other progressive companies," he explained, "we are always trying to improve our methods, to prune our costs, to achieve the greatest possible productivity per man-hour. That means, of course,



The shell of a fan is shown here after being partly unpacked for final assembly. The shell was shipped from Indiana in the same wirebound box that will carry the completed unit to its final destination. The shell was bolted to the base and top of the box. The one-piece wrap-around "mat" that comprises the four sides of the box has been removed here. It will be re-used to "wrap up" the completely assembled unit.



A carload of package attic fans is packed and ready for shipment from the Memphis factory of Hunter Fan and Ventilating Co. Each package weighs 195 pounds. The shipping container tare weight is 20 pounds.

A completely assembled Hunter "Zephair" attic fan is being packed in the identical container that brought only its shell to the Hunter factory at Memphis from Indiana. The shell was bolted to the top and bottom of the box in Indiana, and the fan was assembled at Memphis without removing either. Only the wrap-around "mat" that comprises the four sides of the shipping container was removed to permit assembly of the unit. Shown here is the "mat" being replaced in position.



that we have investigated, and even experimented with, other packing-for-shipment methods and containers.

"During the years that we have used this wirebound box for shipment of fan shells from Indiana and for repacking with completed fan units, we have found nothing to equal it for economy, efficiency, and thorough protection to the contents during shipment and handling."

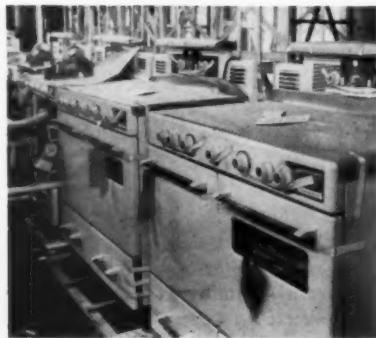
Both the Hunter and the Robbins & Myers brands of fans are distributed over a wide area, yet reports of damage during shipment are practically non-existent. Distributors and retailers of the units also are pleased by this method of packing because of the speed and ease with which fans can be unpacked either for installation or display.

World's strongest tape?

Super-strong, shock-resistant "Scotch" Brand Filament Tape cuts damage claims, speeds production of household appliances



Even "Hard Boiled" Haggerty can't break it!



STOVES: "Scotch" Brand Filament Tape holds doors, drawers and control knobs tight during shipment, yet doesn't scratch glossy baked-enamel finish. Tape adhesive absorbs shocks.



WASHERS: "Scotch" Brand Filament Tape grips wringer parts for shipping where usual banding materials couldn't possibly be used. Tape leaves no adhesive residue. No disposal problem.



DRYERS: "Scotch" Brand Filament Tape prevents jarring and cracking of doors and other loose parts. Tape has tensile strength of up to 500 lbs. per inch of width, is easy and quick to apply.



SHIPPING ROOM: "Scotch" Brand Filament Tape reinforces corrugated containers used for heavy appliances. Cost comparison proves tape saves over regular banding methods. In many cases short strips will do the job.



APPLYING: "Scotch" Brand Filament Tape goes on a lot faster with this new hand dispenser. For a FREE sample roll of tape for testing purposes, write Minnesota Mining & Mfg. Co., Dept. F-103, St. Paul 6, Minn.



Made in U.S.A. by
MINNESOTA MINING & MFG. CO.
St. Paul 6, Minnesota



The term "Scotch" and the plaid design are registered trademarks for more than 300 pressure-sensitive adhesive tapes made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N.Y. In Canada: London, Ont., Can.

Maytag "torture chamber" helps reduce packing costs, in-transit damage

A MODERN "torture chamber" at The Maytag Company, Newton, Iowa, serves to furnish information leading to reduced packaging costs and less in-transit damage for packaged home laundry equipment, including automatic washers and dryers.

In this testing laboratory, packaging engineers submit packaged machines to vibratory and impact tests. These tests prescribed by the National Safe Transit Committee, simulate in-transit and handling shocks experienced by packaged goods during shipment.

These results permit packaging engineers to study continually the effectiveness of packaging design, to eliminate unnecessary package reinforcement, and to add protective materials where required. Thus, the most effective and economical package is obtained with complete assurance of minimum in-transit loss and damage.

Corrugated fiberboard containers, secured by two bands of steel strapping are used for shipping Maytag automatic washers and dryers. Effectiveness of pre-shipment testing has been proven by a reduction in shipping losses.

Periodically, standard packaged units are removed from the assembly line and taken to the testing laboratory. These units are subjected to two tests suggested by the National Safe Transit Committee as a result of their study to determine maximum shocks encountered by packages shipped on all types of carriers.

The tests are conducted on (a) vibrating platforms and (b) a Conbur incline tester. The first test requires

that the packaged laundry product be placed on the platform for one hour at a vibratory rate of 1 "g". To give the packaged machine this vibration intensity, the test unit is set to operate at a rate that will permit a 1/32" gauge to pass under the packaged product while it is bouncing on the vibrating platform.

Following the period of vibration, the packaged unit is placed on the rail-mounted dolly of the Conbur.

Next, the dolly is hauled up the rails to a distance sufficient to provide the required shock magnitude, and then released. The impact on the packaged unit, resulting when the package strikes the butt plate, is repeated five times — once on each package side and once on the package bottom.

Following completion of these two tests, the package is examined and its contents inspected to ascertain whether machine performance has

Maytag uses the standard National Safe Transit tests. Shown here is incline impact test. On following page is shown the vibration test.





Automatic washer being subjected to test on vibration platform.

been affected. Continual spot checks of packaged machines from the production line enable Maytag to provide maximum protection to their products at a minimum cost.

The presently used shipping package for automatic washers and dryers is a 7/16" thick, double-wall fiberboard container. A corrugated liner protects the laundry machine

finish. Container caps, with flaps designed to interlock with the tube section of the container, enclose the unit at the top and bottom. The interlocking feature also seals out dirt and dust.

SAFE TRANSIT CERTIFICATION FOR JOHN WOOD, RYAN REFRIGERATION, U. S. RUBBER

The National Safe Transit Committee, Washington, D. C. has announced the certifications of John Wood Company, Conshohocken, Pa.; Ryan Refrigeration Company, Hopkins, Minn.; and United States Rubber Company, Fort Wayne, Ind.; bringing to 135 the number of manufacturers in the NST program.

THIRD MENGE LAB. CERTIFIED

The National Safe Transit Committee has announced the certification of the Corrugated Box Division of The Mengel Company, Fulton, N.Y., as the 25th laboratory participating in the NST program. It is the third Mengel laboratory to be certified.

the grip of an iron fist



in a soft velvet glove



cush-on-strap by Sackner

A patented Steel Strapping faced with soft, fluffy cellulose padding. CUSH-ON-STRAP is prescored to desired lengths and ready for immediate use. Ideal for packing all types of appliances and other finished metal products.



ST-10

COMPLETE PACKAGING COURSE OFFERED AT MICHIGAN STATE

Climaxing more than three years of planning, the Forest Products Department of Michigan State College, East Lansing, Michigan, now has a neat package to offer this fall in the industrial field called packaging technology.

It's a four-year curriculum covering engineering, salesmanship, business administration and wood utilization, plus a general college training. Seven students took a container course last winter, but now the four-year program is under way.

What does the program cover? The first two years, in addition to general subjects—like communications skills, natural and social sciences, mathematics, military science and physical education—the student also has engineering drawing, manufacturing processes, packaging principles and wood preservation.

In the junior year, special subjects include industrial packaging, engineering and organization; engineering statistical methods, and packaging materials. Then, as a senior, there is training in consumer and industrial packaging, cost analysis, traffic administration, accounting, and business speaking, law, letter writing and report writing. Elective subjects—such as salesmanship—round out the program according to the field the student plans to enter, and his graduation requires 16 weeks of practical experience in industry with a favorable report.

OCTOBER • 1953 finish

Industrial packing, materials handling show to be held in Boston

THE 1953 annual "triple feature"—exposition, competition, and technical short course—sponsored by the Society of Industrial Packaging and Materials Handling Engineers is assured of surpassing all previous such events held outside the SIPMHE headquarters city of Chicago, and promises to surpass even the 1952 record-making event.

Chairmen of all three concurrent events have reported to C. J. Carney, Jr., SIPMHE managing director, that their respective programs are well advanced and that unprecedented interest in the 1953 event is being shown throughout industries concerned with industrial packaging and materials handling.

Advance hotel registrations in Boston, where the triple event will be held October 19-22, already indicate a great influx of visitors to that city. All three events will be held in Mechanics Hall, the technical short course opening Monday morning, October 19, the competition being decided Tuesday morning, and the exposition opening that noon.

Exhibit space sold out

The space originally reserved in Mechanics Hall for the show was completely sold out about August 1, and exhibit spaces in 30,000 additional square feet adjoining the original area have already been reserved in considerable numbers, according to a spokesman for the Society.

Animation will be added to the exposition this year by means of a series of 20-minute demonstrations of materials handling equipment and other equipment and supplies on exhibit.

Twenty-minute demonstrations will commence at 1 p.m., with five to ten minutes between demonstrations according to a planned schedule. The demonstration area is about 40 by 85 feet, and is located in the annex portion of the exposition exhibit area, close to both exhibits and the annual protective packaging and materials handling competition.

The four-day course in industrial packaging and materials handling, sponsored this year by the Mechanical Engineering Department of the Massachusetts Institute of Technology, will present divisions for both those who seek training in the fundamentals of industrial packaging and materials handling, and for the experienced engineers seeking advanced training in specialized fields.

The short course will be divided into two sections. One will be the "Packaging and Materials Handling Advanced-Executives Section" and the other will be "Fundamentals of Packaging Section." Separate sessions in the advanced-executives section are scheduled to consider packaging and materials handling.

Joseph H. Stoneking, of General Box Co., has been appointed chairman of the Exhibitors' Committee for the 8th annual exposition. His duties will include the maintenance of liaison between exhibitors and the show management, and otherwise serving to assure smooth functioning of the exposition.

Other officials of the Exposition, as announced previously, include Thomas W. Regan, of General Box

Partial List of Subjects on Short Course Agenda

Relationship Between Materials Handling and Product Design	Packaging — An Art or a Science
Materials Handling Influences in New Plant Construction	Interior Packaging
Improving Materials Handling Efficiency in Old Buildings	Principles of Cushioning
Organizing a Packaging and Materials Handling Research Program	Basic Forms of Interior Packaging
Some Trends in Industrial Palletization	Elements of Preservation
Freight Loading for Rail and Truck	Containers Testing — The Modern Method of Evaluation
Principles of Blocking & Bracing, Unitizing & Palletizing	Shock and Vibration — A Discussion of Cushioning Evaluation
Case Studies — Application of Principles of Materials Handling	Shock and Vibration — Growing Factor in Packaging Design
Case History — Materials Handling Benefits of Work Simplification	Practical Evaluation of Cushioning—Some Problems and Solutions
Air Cargo — Panel Discussion	Cushioning Materials in the Packaging of Fragile Goods
	Case Histories—Scientific Protective Packaging Pays Off

Co., exposition general chairman; John W. Kraus, of Thompson Products, Inc., chairman of short course, with Prof. John E. Arnold, of MIT, as advisor; and Ray A. Mantz, International Harvester Company, chairman of protective packaging competition.

Packaging competition judges

The panel of judges for the 8th annual competition, as announced by Mantz, include the following:

Group 1—*Corrugated or Solid Fibre Boxes* — C. R. Gustafson, American-Standard, chairman; F. R. Campbell, Armstrong Cork; E. F. Dival, Corn Products Refining; H. G. Nelson, Owens-Illinois Glass; P. A. Parker, Anchor Hocking Glass.

Group 2—*Nailed Wood Boxes and Crates* — Wilburn Couch, General Motors, chairman; K. W. Kruger, Forest Products Laboratory; W. B. Keefe, Westinghouse; O. T. Sands, Sears, Roebuck & Co.



Joseph H. Stoneking, chairman of exposition exhibitor's committee.



How these crates saved one shipper 40% on crating costs

This shipper saves a full 40%, just on the initial cost of these Weyerhaeuser-designed crates. Total savings on crating and shipping costs run even higher, because these low-cost Weyerhaeuser crates also gave this company these additional advantages:

1. Contents need no anchoring, blocking or padding to give the crate rigidity—which means better protection for contents as well as lower packing costs.
2. Crated products can be safely stacked to save warehouse space.
3. They weigh 35% less than crates previously used.
4. Assembly is faster because the design automatically positions the panels.

Perhaps your crates can be re-designed to reduce costs and eliminate many costly damage claims. Expert design service is offered by Weyerhaeuser crating engineers on sectional crates. Write for information and suggestions on your particular needs.

Weyerhaeuser Sales Company

Industrial Wood Parts Department

Room 2143 • 400 West Madison Street • Chicago, Illinois

ST-14

Group 3—*Wirebound Boxes and Crates* — G. E. Falkenau, DuPont; E. H. Stivers, Package Research Laboratory; R. F. Uncles, American Cyanamid; R. L. Brandes, General Electric; M. L. Gusler, Ford Tank Division.

Group 4—*Cleated Panel Boxes* — John Mount, U.S.A.F., chairman; P. H. Paulsen, Wm. H. McGee & Co.; L. R. Burroughs, Ford Motor; J. L. Krager, Jr., RCA Victor; J. A. Mustard, Jr., Thomas A. Edison, Inc.

Group 5—*General* — J. P. Corcoran, Aldens, Inc., chairman; H. F. Jacobsen, American Steel & Wire; C. S. McNair, Acme Steel; B. R. Olhausen, Alcoa.

Group 6—*Export Packages* — C. J. Zusi, Container Laboratories, chairman; Joseph Lebl; H. A. Hunt, Burroughs Adding Machine; J. L. Martin; Alvin S. Roberts, Insurance Co. of North America.

Group 7—*Materials Handling* — R. L. Franing, International Harvester, chairman; Ralph O'Reilly, General Motors; L. A. Seversen, Central Scientific; R. J. Sweeney, Drake, Startzman, Sheahan, Barclay, Inc.; A. N. Perry.

Associate chairmen of the national general committee, which R. A. Mantz heads, are Wilmer J. Balster, of The Don L. Quinn Co., and E. J. Dahill, of Freight Loading and Container Section of the Association of American Railroads.

OCTOBER • 1953 finish

CAREFUL CAR HANDLING MONTH

The Association of American Railroads has announced that "October will be designated as *Careful Car Handling Month*, during which a special effort will be made to carry the message of careful car handling to all officers and employees."

ACME STEEL NAMES WINNERS IN STEEL STRAPPING CONTEST

Acme Steel Company, Chicago, has announced the selection of 18 winners in its industry-wide flat steel strapping contest.

First grand prize of an all-expense trip to Bermuda for two (or \$1000) went to H. W. Davies, of the Port of Port Angeles, Washington. Second prize of \$500 went to Howard D. Elsasser, of W. A. Riddell Corp., Bucyrus, Ohio, and third prize of \$250 went to Carter Anderson, of Boeing Airplane Co., Seattle.

Fifteen additional cash prizes of \$100 each were awarded to entries taking 4th to 18th place. The company received a total of 583 entries. Purpose of contest was to bring to light new and unique ways in which flat steel strapping can be used to help all industry do a better job of packaging, shipping and handling material.

UNITIZING BASIS

OF NEW SIGNODE CAMPAIGN

Signode Steel Strapping Co., Chicago, recently surveyed over 35,000 of their customers. As a result of this survey, it was learned that many of them wanted more information on palletizing, unit bundling, skids and materials handling.

A study of the survey led to the company's present advertising campaign on "unitizing," which the company reports is an effort to present to materials handling men a clear understanding of six basic ways of unit bundling.

INDUSTRIAL BAG, COVER ASSN. EXTENDS CONTEST DEADLINE

The Industrial Bag & Cover Association New York City, has announced the extension of the time for receipt of entries in their competition

for a "form-fitting, flexible package for an article not presently packaged in bag or cover form." The new time limit is midnight, November 10.

AAR CONDUCTING SEMINARS ON CONTAINER RESEARCH

The fourth and final in a series of seminars conducted at the Container Research and Development Laboratory of the Association of American Railroads, in Chicago, will be held

during the week of October 19-23. C. A. Naffziger, director of the AAR Freight Loss and Prevention Section announced that due to the success of these seminars, and the interest shown by the railroad representatives attending the same, that a similar series of seminars will be conducted during 1954.

A group of twenty-nine railroad men and two representatives from the U.S. Army Transportation Corps attended the last seminar.



Cleated Fibre Shipping Containers

for Refrigerators, Ranges, Washers, Furnaces and other appliances

Major appliances are handled and shipped with greater safety when packaged in cleated fibre containers.

Cornell Cleated Fibre Containers are dirt-proof, light in weight, strong, and can be printed to dramatically display and advertise your product.

North Western finds merit in new type of car blocking

using metal blocking angles for load bracing at freight transfer stations

by H. A. Wetter •

SUPERINTENDENT, LOSS AND DAMAGE PREVENTION, CHICAGO AND NORTH WESTERN RAILWAY SYSTEM, CHICAGO, ILLINOIS



At the time metal blocking angles were first tested out on our line, destination agents were requested to make a report to this office on each individual car in which this blocking was used. The metal blocks were used as a replacement for the ordinary wooden blocking in merchandise cars to support crates of machinery, large boxes, castings, etc.

Forty-three cars were loaded on this test basis, on which 31 replies

were received. Of these 31 cars, 25 were unloaded at destination with all blocking intact. In two instances the blocking had loosened on the car floor because of improper nailing. In two other instances the metal blocking has pulled loose because it was used to retain machinery of too great a weight. In one car, the metal blocking had pulled loose because of a poor nailing area in the floor.

Complimentary reports from destination agents

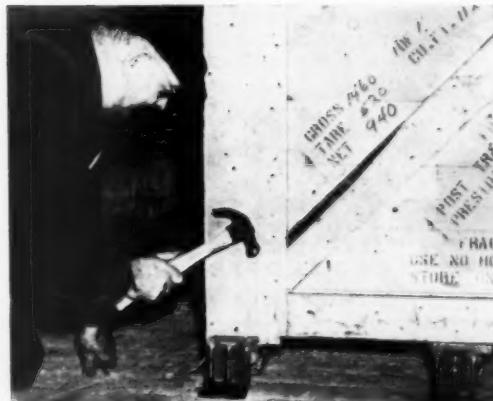
Some very complimentary reports

were received in connection with this type of blocking.

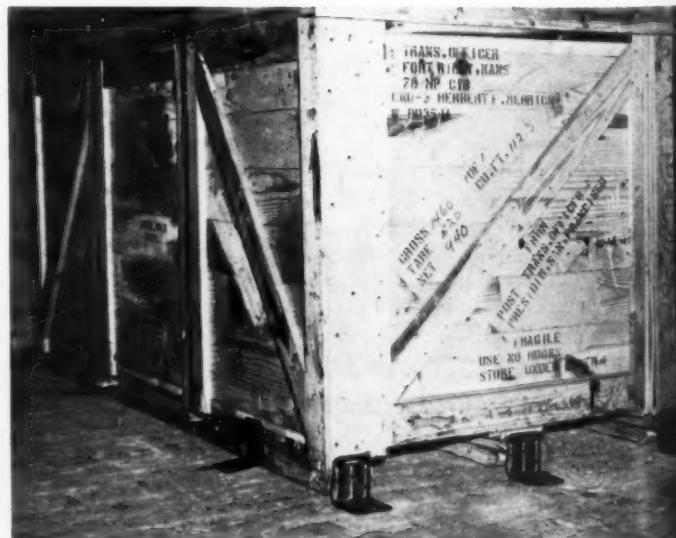
One agent stated in his report: "I beg to inform you that the machine was in place and had not moved, and would say it is very good blocking." Another report stated "Machine weighed 2100 lbs. Steel blocking angles in front of each skid were intact. Machine did not shift during transit."

Another agent commented as follows: "Apparently this new type of steel blocking did a good job as the machinery showed no shifting in the car."

Below: Bracing a 1460-pound load of boxed machinery with metal blocking angles. Right: Completed bracing includes three angles on front and two along the side of the box.



ST-16



OCTOBER • 1953 finish



Another type of metal blocking angles used for corner bracing.

Regarding a shipment of machinery blocked with the steel angles, another reported "I wish to advise that shipment arrived at this station in good condition and consignee advised that machine was OK."

Another agent reported "This shipment of machinery was consigned to the Superior Water Light and Power Company, Construction Department, and that firm advises that the blocking and the load on this shipment were in very good shape; that the load was of a very fragile nature, but the blocking protected it very well."

We considered the use of the metal blocking angle a matter of economy, and added security, and have adopted them for use at all transfer stations.

Close-up view of metal blocking for load shown on the right.



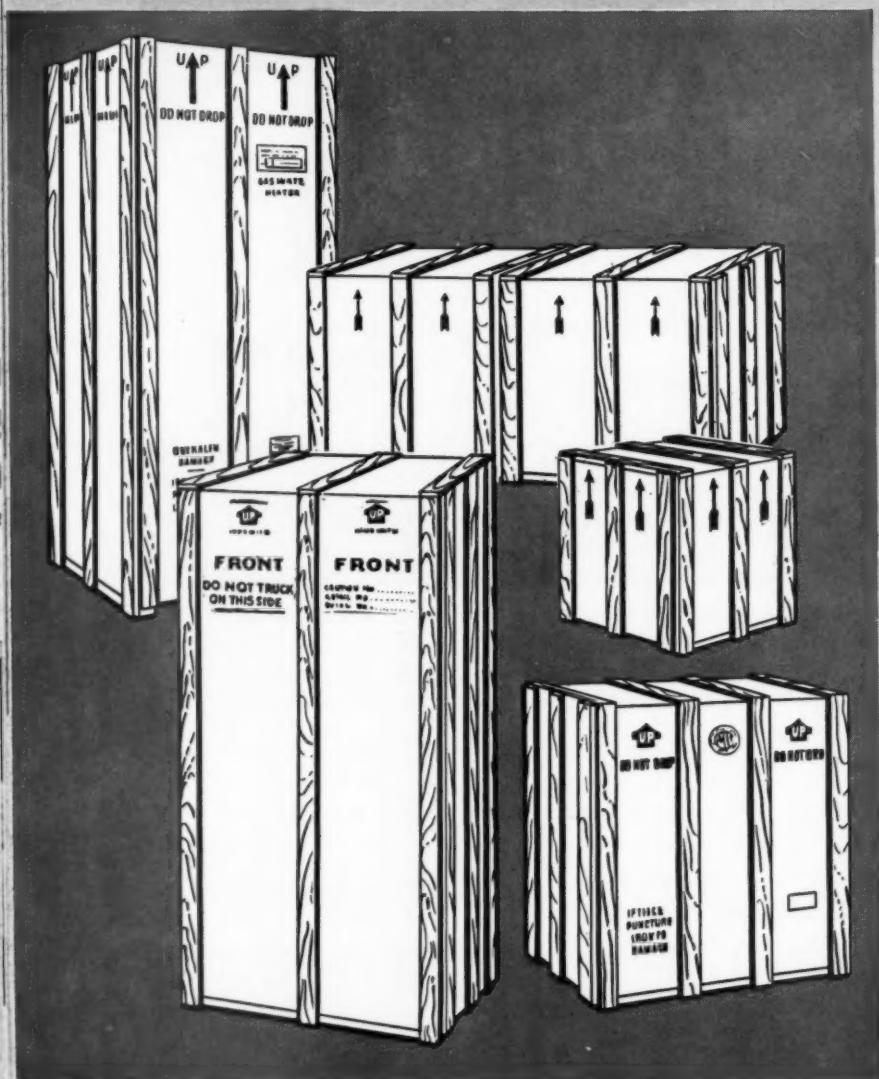
H. A. Wetter (left), superintendent of loss and damage prevention for Chicago and North Western Railway System, discusses the merits of metal blocking angles with A. J. Kopitke, general foreman of the railway's freight station located beneath The Merchandise Mart building in Chicago.

Below: Two metal blocking angles used as bracing for a crated air heater blower. Weight of crated product is 1200 pounds.

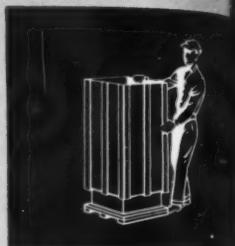


Ship safely in WATKINS cleated corrugated containers

WATKINS GIVES GREATER STACKING STRENGTH



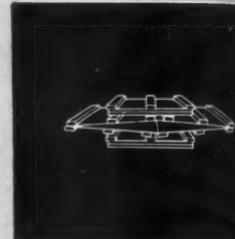
ASSEMBLY is speeded up with this easy-to-handle container. The assembly crews are all for packing the Watkins Way.



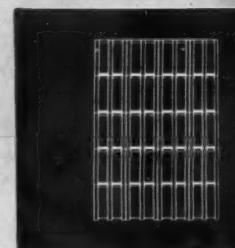
HANDLING shocks in the factory, in transit, and during delivery are resisted by the wood cleats, glued tube mat construction.



STORING problems are reduced to a minimum because of the 3-section design which provides for flat, close nesting.



STACKING is easy and safe, due to the supporting strength (minimum 4 tons on most containers) that is engineered into the Watkins design.



... use the
"Traveling Billboard" feature
for product advertising ...

these companies build
WATKINS CONTAINERS

Cornell Paperboard Products Co.	1514 E. Thomas Ave., Milwaukee, WI
Cozier Container Corp.	446 East 131st Street, Cleveland, OH
Crate-Rite Mfg. Corp., Division of Pacific Ports Ind. Inc.	10901 Russett Street, Oakland, California
Dura-Crates, Inc.	940 East Michigan Street, Indianapolis, Indiana
General Box Co.	1825 Miner St., Des Plaines, Illinois
Hemb & Martin Mfg. Co.	16th and Maple Sts., Louisville, Kentucky
Illinois Box & Crate Co.	Watseka, Illinois
Kieckhefer Box & Lumber Co.	811 Center Street, Plainfield, Illinois
Lane Container Corp.	1715 West Canal Street, Milwaukee, Wisconsin
Lewisburg Container Co.	10212 Denton Road, Dallas, Texas
Livingston Wood Manufacturing, Ltd.	243 Singer Street, Lewisburg, Pennsylvania
Love Mfg., Inc.	Tillsonburg, Ontario, Canada
Pennsylvania Box & Lumber Co.	608 South Commerce Street, Wichita, Kansas
Utility Crate Corporation	2331 N. Bodine St., Philadelphia, Pennsylvania
—an inquiry to any of these companies will get prompt attention	

SAFETY, CLEANLINESS, LOW COST

For home appliances, for *all* types of finished products, the Watkins Container is your best insurance for safe delivery. Safety is ENGINEERED into every Watkins Container.

Cleanliness is another important point for manufacturer and for distributor, dealer and final customer. Watkins protects the fine finishes of your products and keeps out dust and dirt.

When you consider, too, that Watkins Containers are delivered 75% assembled and are designed to save you labor, time and money, the sum of all of these advantages should lead you to a Watkins manufacturer now.



The
WATKINS CONTAINER • Manufacturers

Next Month

In November 1953 finish

A new drying process for industrial finishes. Continuous process dries many types of product finishes in 5 to 30 SECONDS without the use of heat.

A new enamel for industrial use which is non-inflammable. Drop a match in a tankful without danger.

A new heat-resistant non-yellowing enamel for appliances, incorporating silicones but at 1/2 the price of conventional silicone finishes.

For advance information on these developments, write direct to:
finish, Reader Service Desk,
360 N. Michigan, Chicago 1, Ill.

Silicone finishes . . .

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better corrosion resistance than a formulation containing 22% pigment or one part of aluminum paste to two parts of silicone resin solids. Pigment concentrations higher than 50% have resulted in over-pigmentation and poorer performance.

Metallic additions needed for high temperature resistance

The decomposition temperature of silicones is in the range of 650-700° F. Thus, paints formulated with non-metallic pigments are limited in temperature stability to that of the silicone resin vehicle.

For improved corrosion protection at temperatures below 650° F., silicone primer formulations can be used to advantage. These can be formulated using conventional zinc chromate and iron oxide pigments. Their use with aluminum or colored silicone top coats will give excellent corrosion protection.

Various colored silicone coatings can be formulated with heat stable inorganic pigments. As in the primer formulations, the colored paints are

limited to temperatures below the decomposition temperature of the silicone vehicle. By proper choice of the inorganic pigments, paints can be formulated to give continuous operation in the 500-600° F. temperature range. Certain pigments such as iron oxide and chrome oxide have been used at temperatures up to 750° F. for short periods of time.

Colored silicone finishes for the appliance field

Colored silicone finishes are being used in many applications where both decorative and heat-resistant properties are required. Some of the major uses of colored silicone coatings include home space heaters, incinerators, military barracks heaters, ordnance tank and truck heaters, automotive manifolds, thermometers, ovens and furnaces, and many others.

In all of these applications silicones are used because they either give more economical maintenance costs, despite their high cost per gallon, or they do a job where organic materials are not satisfactory.

Because of the high cost of silicone paints, considerable attention has been centered on ways to obtain

intermediate properties by modifying them with organic resins.

There are on the market today a variety of aluminum paints containing from 10 to 100% silicone resin as the vehicle. These lower silicone containing paints are useful in the lower temperature range of 400-500° F. but at temperatures above 500° F. the corrosion resistance will be more or less directly proportional to the silicone content. Thus, for the highly corrosive and hot applications, it is important that one determines whether a 100% silicone paint is required.

Silicone structures with organic modifiers

In a number of the industrial applications such as the appliance field, the use of silicone resins has been limited because of their high temperature baking properties, moderate adhesion and thermoplasticity. In our effort to improve these properties and also lower the cost, considerable work has been done in modifying the silicone structure with organic groups. A number of copolymers have been made in an effort to improve the above mentioned properties and maintain the heat-resistant properties of the silicones.

A group of these copolymers which are available are the silicone-alkyd resins. Paints formulated with these resins have exhibited much improved film properties over conventional alkyd resins, especially in the 400-700° F. temperature range. These silicone-alkyds have been further modified with drying oils to give air drying resins which have excellent weather-resistant properties.

These latter resins are of most interest because of their ability to air dry and also withstand temperatures above standard organic paints. Another property of these paints is their improved chalking resistance. This results in less fading of many colored finishes.

This chalk-resistant property is exhibited markedly on several distillation towers. Here, yellow maintenance finishes have been used and showed considerable fading and chalking after exposure for one year. A silicone-alkyd yellow paint was

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360 N. MICHIGAN AVE., CHICAGO 1, ILL.
6 E. 39th St., New York 16, N. Y. (Bob Weston)

"I saw your ad in finish"

applied 18 months ago, and to date has shown no signs of discoloration or chalking. Several power house stacks have also been painted with this type of finish in grey and black colors. Here the operating temperatures vary from 50 to 450° F. The silicone-alkyd is giving excellent service and corrosion protection in this application.

There appears a definite place in maintenance coatings for these modified silicone materials, especially in those applications where temperature extremes are involved and corrosion is a problem.

Continued work is in progress to improve both the 100% silicone resins and the newer lower cost modifications. Ultimately they should do much to improve our fight against the elements.

Editor's mail

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ful in our procurement functions for the Air Force. . . .

Maj. Robert B. Carruth, USAF
Dir. of Personnel and Services
Southern Air Procurement
District
Fort Worth, Texas

2 million clothes dryers

Gentlemen:

We would appreciate having your permission to use the article, "Expected Annual Volume—2 Million Dryers", by Robert M. Mitchell, which appeared in the September issue of *finish* magazine, page HL-13, in a bulletin to our representatives, distributors and dealers.

L. D. Grant
General Sales Manager
The Stiglitz Corporation
Louisville, Kentucky

permission has been granted, Mr. Grant.

wants a recent issue, c.o.d.

Gentlemen:

The National Association of Metal Stampers (Pressed Metal Institute), advises that your publication is very informative to the stamping industry.

We would appreciate having a recent copy of said publication, and mail C.O.D. at your early convenience.

E. E. Laubscher
Secretary-Treasurer
Kifer Tool and Die, Inc.
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